

TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	Alpine/Luna Lake Watershed Group 319 Project UGLUN-L1 (wildlife restricted area)	2001 - 4 field 2002 - 8 field	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	2 - 13.4 (22-152%)	5 of 9		
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL)	8.4 - 9.5	5 of 12		
	Alpine/Luna Lake Watershed Group 319 Project UGLUN - L2 (north of fishing dock)	2001 - 4 field 2002 - 8 field	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	2 - 11.8 (22-130%)	4 of 10		
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL)	8.7 - 9.5	4 of 12		
	Alpine/Luna Lake Watershed Group 319 Project UGLUN - L3 (3 meters above dam)	2001 - 4 field 2002 - 8 field	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	1.7 - 12.7 (18.6-140%)	4 of 10		
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL)	8.6 - 9.6	5 of 12		
	ADEQ Lakes Program UGLUN-A (dam site) 100036	1999 - 1 partial suite 2002 - 1 partial suite	No exceedances					Note samples were taken on the same date at the two ADEQ sites.
	ADEQ Lakes Program UGLUN-B (mid lake) 100979	1999 - 1 partial suite 2002 - 1 partial suite	No exceedances					
	Summary Row A&Wc Not attaining FC Inconclusive FBC Not attaining AgL Not attaining	1998 - 2002 43 samples 18 sampling events	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	1.7 - 13.4 (18.6 - 152)	14 of 43	Not attaining	<p>A total of 43 samples were collected at 6 sites by ADEQ, AGFD, and the Alpine/Luna Lake Watershed Group (for a 319 Implementation project) in 1998 - 2001.</p> <p>A nutrient TMDL to address pH and dissolved oxygen problems was approved by EPA in 2000. Assessed as "not attaining" due to low dissolved oxygen and pH exceedances.</p> <p>Placed on the Planning List due to a fish kill in 1999. Fish kill may be evidence of a narrative standard violation.</p> <p>Also placed on the Planning List for TMDL-follow up monitoring and missing core parameters: turbidity, <i>Escherichia coli</i>, dissolved metals (copper, cadmium, zinc), and total metals (mercury, copper, and lead).</p>
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL)	8.4 - 9.93	16 of 43	Not attaining	
Roper Lake AZL15040006-1250 A&Ww, FC, FBC	ADEQ Lakes Program UGROP - A (dam site) 100080	1998 - 1 partial suites 2000 - 3 partial suites	No exceedances					
	ADEQ Lakes Program UGROP - B (mid lake) 100975	1999 - 1 suite 2000 - 1 suites	No exceedances					
	ADEQ Lakes Program UGROP - Pond 100976	1999 - 1 suite 2000 - 2 suites	No exceedances					

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ Lakes Program UGROP - Canal 100978	2000 - 3 suites	No exceedances					
	Summary Row A&Ww Attaining FC Attaining FBC Inconclusive	1998-2000 12 samples 5 sampling events	No exceedances					ADEQ collected 12 samples at 4 sites in 1998-2000. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameter: <i>Escherichia coll.</i>

TABLE 22. UPPER GILA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
UPPER GILA WATERSHED -- STREAM ASSESSMENTS				
Ash Creek unnamed tributary at 32°45'37"/109°52'22" - Gila River 15 miles AZ15040005-040B (Reach was split into warmwater and coldwater segments since last assessment. No current data in 040A.)	A&Ww Inconclusive FC Attaining FBC Attaining AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : dissolved metals (cadmium, copper and zinc).		
Blue River New Mexico border - KP Creek 21 miles AZ15040004-026	A&Wc Inconclusive FC Inconclusive FBC Attaining AgI Inconclusive AgL Inconclusive Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, manganese, lead, and copper).		
Blue River KP Creek - Strayhorse Creek 4 miles AZ15040004-025A (Reach was split into warmwater and coldwater segments since last assessment.)	A&Wc Inconclusive FC Inconclusive FBC Attaining AgI Inconclusive AgL Inconclusive Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : total boron, total metals (mercury, manganese, lead, and copper), and dissolved metals (copper, cadmium, and zinc).		
Blue River Strayhorse Creek - San Francisco River 25 miles AZ15040004-025B (Reach was split into warmwater and coldwater segments since last assessment.)	A&Ww Attaining FC Attaining FBC Attaining AgI Attaining AgL Attaining Category 1 -- Attaining All Uses			
Bonita Creek Park Creek - Gila River 15 miles AZ15040005-030 Unique Water	A&Ww Attaining FC Attaining FBC Attaining DWS Attaining AgL Attaining Category 1 -- Attaining All Uses			
Campbell Blue Creek headwaters - Blue River 20 miles AZ15040004-028	A&Wc Inconclusive FC Attaining FBC Attaining AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameter</u> : dissolved copper.		

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SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Cave Creek headwaters - South Fork of Cave Creek 8 miles AZ15040006-852A Unique Water (Reach was split into warmwater and coldwater segments since last assessment.)	A&Wc Inconclusive FC Attaining FBC Attaining Agl Attaining AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>chronic selenium</u> exceedances (2 of 2 sampling events).	<i>add Se</i>	
Cave Creek South Fork of Cave Creek - USFS boundary 2 miles AZ15040006-852B Unique Waters (Reach was split into warmwater and coldwater segments since last assessment.)	A&Ww Inconclusive FC Attaining FBC Attaining Agl Attaining AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to former <u>turbidity</u> standard exceedance (1 of 9 samples). Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed.		
Cave Creek, North Fork headwaters - Cave Creek 6 miles AZ15040006-856	A&Wc Inconclusive FC Inconclusive FBC Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Cave Creek, South Fork headwaters - Cave Creek 8 miles AZ15040006-849 Unique Water	A&Wc Attaining FC Attaining FBC Inconclusive Agl Attaining AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>Escherichia coli</u> exceedance (1 of 10 sampling events, occurred in 2000).		
Eagle Creek headwaters - unnamed tributary at 33°23'24"/109°29'35" 12 miles AZ15040005-028A (Reach was split into warmwater and coldwater segments since last assessment. No current data in 028B.)	A&Wc Inconclusive FC Inconclusive FBC Attaining DWS Inconclusive Agl Inconclusive AgL Inconclusive Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : total boron, total metals (mercury, arsenic, chromium, lead, manganese, and copper), and dissolved metals (copper, cadmium, and zinc).		
Eagle Creek Willow Creek - Sheep Wash 6 miles AZ15040005-027	A&Ww Attaining FC Attaining FBC Attaining DWS Attaining Agl Attaining AgL Attaining Category 1 -- Attaining All Uses			

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SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Eagle Creek Sheep Wash - Gila River 25 miles AZ15040005-025	A&Ww Attaining FC Attaining FBC Attaining DWS Attaining Agl Attaining Agl Attaining Category 1 -- Attaining All Uses			
East Turkey Creek headwaters - unnamed tributary at 31°58'22"/109°12'17" 8 miles AZ15040006-837A (Reach was split into warmwater and coldwater segments since last assessment. No current data in 837B.)	A&Wc Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Category 3 - Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Frye Canyon Creek headwaters - Frye Mesa Reservoir 5 miles AZ15040005-988A (Reach was split into warmwater and coldwater segments since last assessment. No current data in 988B.)	A&Wc Inconclusive FC Inconclusive FBC Attaining DWS Inconclusive Agl Inconclusive Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : dissolved metals (copper, cadmium, and zinc) and total metals (mercury, arsenic, chromium, lead, and copper).		
Gila River New Mexico border - Bitter Creek 16 miles AZ15040002-004	A&Ww Inconclusive FC Attaining FBC Attaining Agl Attaining Agl Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>chronic selenium</u> exceedance (1 of 1 sampling event). <u>Remove turbidity</u> from Planning List as turbidity is attaining standards (no exceedances in 4 samples).		
Gila River Skully Creek - San Francisco River 15 miles AZ15040002-001	A&Ww Impaired FC Attaining FBC Inconclusive Agl Attaining Agl Attaining Category 5 -- Impaired	On the Planning List due to: 1. <u>Low dissolved oxygen</u> (1 of 9 samples). 2. <u>Lead</u> exceedance (1 of 8 samples).	Add selenium to the 303(d) List due to chronic selenium exceedances (3 of 3 sampling events). (Note that the lab reporting limits on 7 other selenium samples were too high to assess the chronic standard, so the samples could not be included in the assessment.)	

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Gila River San Francisco River - Eagle Creek 3 miles AZ15040005-024	A&Ww Not attaining FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 4D - Not attaining	On the Planning List. No current monitoring data. Added to the Planning List in 2002 due to former turbidity standard exceedances (12 of 12 samples). Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed.	→ TURB/SSC	To be consistent with other assessments, this reach is included as a Category 4D water (not attaining) and added to the Planning List for the following reasons: 1. Arizona is assessing all waters that are "impaired" under the former turbidity standard (repealed in 2002) "not attaining" until sufficient turbidity or suspended sediment concentration (new sediment standard) data are collected to make an assessment of "attaining" or "impaired." 2. For the 2002 303(d) List, EPA determined that 5 or more exceedances with less than 20 samples were sufficient to list a water as "impaired", although Arizona's Impaired Waters Identification Rule would require a minimum of 20 samples. 3. Turbidity exceeded standards in 12 of 12 samples. (Only older data available.) EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Gila River Eagle Creek - Bonita Creek 10 miles AZ15040005-023	A&Ww Not attaining FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 4D - Not attaining	On the Planning List. No current monitoring data. Added in 2002 due to former turbidity standard exceedances (9 of 12 samples). Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed.	→ TURB/SSC	To be consistent with other assessments, this reach will be included as a Category 4D water (not attaining) and added to the Planning List for the following reasons: 1. Arizona is assessing all waters that are "impaired" under the former turbidity standard (repealed in 2002) "not attaining" until sufficient turbidity or suspended sediment concentration (new sediment standard) data are collected to make an assessment of "attaining" or "impaired." 2. For the 2002 303(d) List, EPA determined that 5 or more exceedances with less than 20 samples were sufficient to list a water as "impaired", although Arizona's Impaired Waters Identification Rule would require a minimum of 20 samples. 3. Turbidity exceeded standards in 9 of 12 samples. (Only older data available.) EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.

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Gila River Bonita Creek - Yuma Wash 6 miles AZ15040005-022	A&Ww Not attaining FC Attaining FBC Impaired Agl Attaining AglL Attaining Category 5 -- Impaired	On the Planning List due to: 1. <u>Lead</u> exceedances (4 of 21 samples). 2. Former <u>turbidity</u> standard exceedances (7 of 24 samples) and potential exceedances of the <u>suspended sediment concentration</u> (SSC) geometric mean standard. Turbidity and SSC monitoring will be scheduled during the next monitoring cycle for this watershed. <i>+ turbid/SSC</i>	<i>add Pb</i> Add <u>Escherichia coli</u> to the 303(d) List due to exceedances in 2 of 8 sampling events. <u>Delist turbidity</u> . Standard repealed in 2002. Assessed turbidity as "not attaining" and placed in category 4D. Although current turbidity data are inconclusive (7 of 24 samples exceed), reach will remain "not attaining" until sufficient turbidity or suspended sediment concentration (new sediment standard) data are collected to make an assessment of "attaining" or "impaired."	Despite issues applying the SSC standard (see discussion in Chapter III), EPA is developing methods to determine base flow which may result in this reach being added to the 2004 303(d) List by EPA. EPA may also use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
K P Creek headwaters - Blue River 12 miles AZ15040004-029 Unique Water	A&Wc Inconclusive FC Inconclusive FBC Attaining Agl Inconclusive Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : dissolved metals (copper cadmium, and zinc) and total metals (mercury, lead, and copper).		
San Francisco River headwaters - New Mexico border 13 miles AZ15040004-023	A&Wc Not attaining FC Attaining FBC Attaining Agl Attaining AglL Attaining Category 4D -- Not attaining	On the Planning List due to former <u>turbidity</u> standard exceedances (6 of 9 samples). Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed. Remove dissolved <u>oxygen</u> from the Planning List, as current data indicate that uses are being attained (only 1 of 10 samples did not meet the standard).	<i>4D!</i>	To be consistent with other assessments, this reach should be included as a Category 4D water (not attaining) and added to the Planning List for the following reasons: 1. Arizona is assessing all waters that are "impaired" under the former <u>turbidity</u> standard (repealed in 2002) "not attaining" until sufficient turbidity or suspended sediment concentration (new sediment standard) data are collected to make an assessment of "attaining" or "impaired." 2. For the 2002 303(d) List, EPA determined that 5 or more exceedances with less than 20 samples were sufficient to list a water as "impaired", although Arizona's Impaired Waters Identification Rule would require a minimum of 20 samples. 3. Turbidity exceeded standards in 6 of 9 samples. EPA may also use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
San Francisco River New Mexico border - Blue River 21 miles AZ15040004-004	A&Ww Inconclusive FC Attaining FBC Attaining Agl Attaining AglL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to former <u>turbidity</u> standard exceedance (1 of 6 samples). Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed.		
San Francisco River Blue River - Limestone Gulch 19 miles AZ15040004-003	A&Ww Attaining FC Attaining FBC Inconclusive Agl Attaining AglL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>Escherichia coli</u> exceedance (1 of 13 sampling events, occurred in 2002). Remove <u>turbidity</u> and <u>beryllium</u> from the Planning List. Data indicate that uses are being attained. Turbidity exceeded standards in only 3 of 16 samples. Arizona's beryllium standard was modified in 2002, and beryllium is not exceeding the new standards. <i>TURB</i>		

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San Francisco River Limestone Gulch - Gila River 13 miles AZ15040004-001	A&Ww Not attaining FC Attaining FBC Inconclusive AgI Attaining AgL Attaining Category 4D - Not attaining	On the Planning List due to: 1. <u>Acute copper</u> exceedance (1 of 22 sampling events, occurred in 2000). 2. <u>Escherichia coli</u> exceedance (1 of 17 sampling events, occurred in 2002). 3. Former turbidity standard exceedances (4 of 21 samples). Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed.	Delist turbidity. Standard was repealed in 2002. Assessed turbidity as "not attaining" and placed in category 4D. Although current turbidity data are inconclusive (4 of 21 samples exceed), reach will remain "not attaining" until sufficient turbidity or suspended sediment concentration (new sediment standard) data are collected to make an assessment of "attaining" or "impaired."	EPA may also use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Turkey Creek headwaters - Campbell Blue Creek 5 miles AZ15040004-060	A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 - Inconclusive	On the Planning List due to <u>missing core parameters</u> : <u>Escherichia coli</u> , dissolved metals (cadmium, copper, and zinc), and total metals (mercury, copper, and lead).		
UPPER GILA WATERSHED -- LAKE ASSESSMENTS				
Cluff Pond #3 15 acres AZL15040005-0370	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgI Inconclusive AgL Inconclusive Category 3 - Inconclusive (not assessed) Trophic status not calculated	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Dankworth Ponds 8 acres AZL15040005-0440	A&Wc Inconclusive FC Attaining FBC Inconclusive Category 2 - Attaining Some Uses Trophic status - Mesotrophic	On the Planning List due to: 1. <u>Acute selenium</u> exceedance (1 of 4 sampling events, occurred in 2000). 2. Former turbidity standard exceedance (1 of 2 samples). Investigation into the causes and sources of turbidity will be investigated during the next monitoring cycle for this watershed. 3. <u>Missing core parameters</u> : <u>Escherichia coli</u> and dissolved metals (copper, cadmium, and zinc).		
Luna Lake 120 acres AZL15040004-0840	A&Wc Not attaining FC Inconclusive FBC Not attaining AgL Not attaining Category 4A - Not Attaining Trophic status - Eutrophic	On the Planning List for: 1. TMDL follow-up monitoring for low <u>dissolved oxygen</u> (14 of 43 samples) and <u>high pH</u> (16 of 43 samples). 2. <u>Missing core parameters</u> : <u>Escherichia coli</u> , turbidity, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, copper, and lead). 3. <u>Fish kill</u> in 1999.	OK	Nutrient TMDL to address low dissolved oxygen, high pH, and recurrent fish kills was approved by EPA in 2000. Placed on the Planning List in 2002 for TMDL follow-up monitoring. Fish kill in 1999 due to algal bloom die-off and associated high pH and low dissolved oxygen. This may be evidence of a narrative nutrient standard violation.
Roper Lake 25 acres AZL15040006-1250	A&Ww Attaining FC Attaining FBC Inconclusive Category 2 - Attaining Some Uses Trophic status - Mesotrophic	On the Planning List due to <u>missing core parameter</u> : <u>Escherichia coli</u> .		

Verde Map being drafted

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
STREAM MONITORING DATA								
Beaver Creek Dry Beaver Creek - Verde River AZ15060202-002 A&Ww, FC, FBC, AgL	ADEQ TMDL Program At SILT0001 VRBEV003.27	1999 - 4 partial suite	Turbidity NTU	50 (A&Ww)	5 - 190	1 of 3		
	ADEQ Ambient Monitoring and TMDL Program at Camp Verde VRBEV003.18 100496	1998 - 3 field 1999 - 5 field + 1 partial suite	Turbidity NTU	50 (A&Ww)	2 - 117	3 of 8		
	ADEQ TMDL Program Montezuma's Castle VRBEV002.62 100706	1999 - 5 field + 1 partial	Turbidity NTU	50 (A&Ww)	2 - 218	1 of 8		
	USGS Ambient Monitoring VRBEV02.44 101542	2002 - 1 partial suite	No exceedances					
	ADEQ TMDL Program at Foam0001 VRBEV002.02	2000 - 2 partial suites	No exceedances					
	ADEQ Ambient Monitoring and TMDL Program VRBEV001.28 101346	1999 - 6 partial suites	No exceedances					
	ADEQ Ambient Monitoring Above Verde River VRBEV000.62 100722	1999 - 1 partial suite	No exceedances					
	Summary Row A&Ww Not attaining FC Inconclusive FBC Inconclusive AgL Inconclusive	1998-2000 29 samples 12 sampling events	Turbidity NTU	50 (A&Ww)	2 - 190	5 of 26	Inconclusive (Not attaining)	ADEQ and USGS collected a total of 29 samples at 7 sites from 1998-2002. Assessed as "not attaining" due to turbidity exceedances. Reach was on 2002 303(d) List for turbidity. Although current turbidity data are inconclusive based on the former turbidity standard, this reach will remain "not attaining" until sufficient turbidity or suspended sediment concentration (SSC) data are collected to make an assessment of "attaining" or "impaired." Placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , dissolved metals (cadmium, copper, and zinc), and total metals (mercury, copper, and lead).

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Camp Creek headwaters - Verde River AZ15060203-031 A&Ww, FC, FBC, AgL	ADEQ Biocriteria Program Above Blue Wash confluence VRCMP009.30 100760	1998 - 1 partial suite	No exceedances					Missing core parameters: <i>Escherichia coli</i> , dissolved zinc, and total metals (mercury, copper, and lead).
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
Colony Wash headwaters - Fort McDowell Indian Reservation AZ15060203-998 A&We, PBC	USGS Special Investigation VRCLW001.43 101519	1998 - 1 partial suite	No exceedances					Missing core parameters: <i>Escherichia coli</i> , dissolved zinc, and total metals (mercury, copper, and lead).
	Summary Row A&We Inconclusive PBC Inconclusive	1998 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
East Verde River headwaters - Ellison Creek AZ15060203-022A A&Wc, FC, FBC, DWS, AgL, AgL	ADEQ Ambient Monitoring Above Second Crossing VREVR015.97 100786	1999 - 2 full suites	Turbidity NTU	10 (A&Wc)	28 - 54	2 of 2		Missing core parameters: dissolved copper. Lab reporting limits for dissolved copper were too high to assess chronic standards.
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgL Inconclusive	1999 2 sampling events	Turbidity NTU	10 (A&Wc)	27 - 54	2 of 2	Inconclusive (see comment)	Insufficient monitoring data to assess. Placed on the Planning List due to exceedances of the former turbidity standard. Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed.
East Verde River Ellison Creek - American Gulch AZ15060203-022B A&Ww, FC, FBC, DWS, AgL, AgL	ADEQ / USGS Fixed Station Above Highway 87 bridge VREVR012.28 100474	1998 - 1 partial suite 1999 - 5 full suites 2000 - 3 full suites 2001 - 4 full suites 2002 - 5 full suites	Lead (total) µg/L	15 (DWS, FBC)	<5 - 21	1 of 18		
			Mercury (total) µg/L	0.6 (FC)	<0.5 - 1.2	1 of 18		
			Nitrogen (total) µg/L	3.0 (A&Ww)	<0.05 - 4.6	1 of 18		
			Selenium (total) µg/L	2 (A&Ww chronic)	<5 - 5.3	2 of 2		Lab reporting limits for 16 other samples were too high to assess chronic standard.
			Turbidity NTU	50 (A&Ww)	2.16 - >1000	3 of 16		

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row	1998-2002	Lead (total) µg/L	15 (DWS, FBC)	<5 - 21	1 of 18	Attaining	USGS collected 18 samples in 1998-2002. Assessed as "attaining some uses" and placed on the Planning List due to selenium exceedances.
	A&Ww	Inconclusive	Mercury (total) µg/L	0.6 (FC)	<0.5 - 1.2	1 of 18	Attaining	
	FC	Attaining	Nitrogen (total) µg/L	3.0 (A&Ww)	<0.05 - 4.6	1 of 18	Attaining	
	FBC	Attaining	Selenium (total) µg/L	2 (A&Ww chronic)	<5 - 5.3	2 of 2 events (insufficient events)	Inconclusive	
	DWS	Attaining	Turbidity NTU	50 (A&Ww)	2.16 - >1000	3 of 16	Attaining	
East Verde River American Gulch - Verde River AZ15060203-022C A&Ww, FC, FBC, DWS, AgI, AgL	USGS Station #09507980 Near Childs VREVR001.42 100739	1998 - 8 full suites 1999 - 5 full suites 2000 - 4 full suites 2001 - 4 full suites 2002 - 4 full suites	Arsenic (dissolved) µg/L	360 (A&Ww acute)	4 - 388	1 of 23		Arsenic concentrations naturally high in ground water. Ground water upwelling when surface flows are less than 5 cfs results in high arsenic levels in the stream and is a natural occurrence. Not included in final assessment.
				190 (A&Ww chronic)		2 of 23		
			Arsenic (total) µg/L	50 (DWS, FBC)	4.0 - 394	7 of 23		
			Boron (total) µg/L	630 (DWS)	50 - 1730	4 of 20		
				1000 (AgI)		2 of 20		
	Dissolved oxygen mg/L	>6 (90% saturation) (A&Ww)	5.6 - 10.6	1 of 23	Low dissolved oxygen due to naturally occurring ground water upwelling. Not included in final assessment.			
	Summary Row	1998-2002	Boron (total) µg/L	630 (DWS)	50 - 1730	4 of 20	Inconclusive	USGS collected 23 samples in 1998-2002. Assessed as "attaining some uses" and placed on the Planning List due to boron exceedances.
	A&Ww	Attaining		1000 (AgI)		2 of 20	Attaining	
	FC	Attaining						
	FBC	Attaining						
DWS	Inconclusive							
AgI	Attaining							
AgL	Attaining							

TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Fossil Creek headwaters - Verde River AZ15060203-024 A&Ww, FC, FBC, AgL	ADEQ Ambient Monitoring Above Salley Mae Wash VRFOS005.67 100785	1999 - 2 full suites	No exceedances					Both samples were collected in the summer.
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1999 2 sampling events	No exceedances				Not assessed	Insufficient monitoring data to assess.
Grande Wash headwaters - Ashbrook Wash 15060203-991 A&Ww, FBC, FC (tributary rule)	USGS Special Investigation VRGRW000.30 101596	1998 - 1 full suite 1999 - 1 full suite 2000 - 1 partial suite	<i>Escherichia coli</i> CFU/100 ml	235	1000 - >20,000	2 of 2		Lab reporting limits for dissolved cadmium were too high to assess standards.
	Summary Row A&Ww Inconclusive FBC Impaired FC Inconclusive	1998 - 2000 3 sampling events	<i>Escherichia coli</i> CFU/100 ml	235	1000 - >20,000	2 of 2 events (in 1999 and 2000)	Impaired	USGS collected 3 samples in 1998 - 2000. Assessed as "impaired" due to <i>Escherichia coli</i> exceedances. Placed on the Planning List due to missing core parameters: dissolved oxygen, turbidity/SSC, dissolved cadmium, and total mercury.
Granite Creek headwaters - Willow Creek AZ15060202-059A A&Wc, FC, FBC, Agl, AgL	USGS Ambient Monitoring #09502960 VRGRA021.70 101580	1998 - 1 partial suite 1999 - 2 partial suites 2000 - 2 partial suites 2001 - 1 partial suite	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max.)	71 - >8000	2 of 4		The lab reporting limits for some cadmium and copper analysis were too high to assess standards.
				126 (FBC geometric mean)	71 - >8000	overall geometric mean = 406		One E. coli exceedance was during a very high flow event. (Insufficient samples for 30- day geo mean)
			Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	4.3 - 10.8 (53 - 162%)	3 of 5		
			Mercury (dissolved) µg/L	0.01 (A&Wc chronic)	<0.1 - 0.3	1 of 2		Lab reporting limit for 2 other mercury samples were too high to assess standards.
	AGFD Ambient Monitoring VRGRA021.46	2000 - 1 partial suite	Dissolved oxygen	>7.0 (90% saturation) (A&Wc)	6.2 (77.1%) saturation	1 of 1		May be natural condition. Sample taken in July 2000 during a drought.

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	Summary Row	1998-2001 7 sampling events	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	71 - >8000	2 of 4 events (in 2000 and 2001)	Inconclusive (see comment)	<p>USGS and AGFD collected a total of 7 samples at 2 sites in 1998-2001. Assessed as "Inconclusive" and placed on the Planning List due to <i>Escherichia coli</i> and mercury exceedances, low dissolved oxygen, and missing core parameters: turbidity/SSC, total metals (copper, lead, manganese, and mercury) and dissolved metals (cadmium and copper).</p> <p>ADEQ has assessed the FBC designated use as "Inconclusive" for the following reasons:</p> <ul style="list-style-type: none"> - One of the two <i>E. coli</i> exceedances was close to the standard (result is 300, standard is 235) and bacterial lab methods provide an estimate of bacteria density (most probable number) (see discussion in Chapter III) - Need at least 5 bacteria samples within a 30-day period to determine the 30-day geometric mean. (The Impaired Waters Identification Rule requires 2 exceedances of the 30-day geometric mean and does not recognize the overall geometric mean established in the newly adopted Surface Water Standards.)
	A&Wc FC FBC Agl AgL	Inconclusive Inconclusive Inconclusive Inconclusive Inconclusive		126 (FBC - geo mean)	71 - >8000	overall geo mean = 406	Inconclusive (need two exceedances of 30-day geometric mean -- see comment)	
			Dissolved oxygen mg/L	>7.0 (90% saturation) (A&Wc)	4.3 - 10.8 (53 - 162%)	4 of 6	Inconclusive	
			Mercury (dissolved) µg/L	0.01 (A&Wc chronic)	<0.1 - 0.3	1 of 2 events (insufficient events)	Inconclusive	
Munds Creek headwaters - Oak Creek AZ15060202-415 A&Ww, FC, FBC (tributary rule)	ADEQ TMDL Program Above O'Dell Lake VRMUN004.3	1998 - 3 partial suites	Turbidity NTU	50 (A&Ww)	5 - 69	1 of 3		
	ADEQ TMDL Program Southeast trib to O'Dell Lake VRMUN004.1	1998 - 2 partial suites	No exceedances					
	ADEQ TMDL Program West trib of Munds Creek Above Pinewood WWTP VRMUN003.5	1998 - 3 partial suites	Turbidity NTU	50 (A&Ww)	5 - 67	1 of 3		
	ADEQ TMDL Program Below Pinewood WWTP VRMUN003.4	1998 - 3 partial suites	No exceedances					
	ADEQ TMDL Program Above Oak Creek VRMUN000.1	1998 - 3 partial suites	No exceedances					

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive	1998 14 samples 3 sampling events	Turbidity NTU	50 (A&Ww)	4 - 69	2 of 14 (same sampling event)	Attaining	ADEQ collected 14 samples at 5 sites in 1998. Assessed as "inconclusive" and placed on the Planning List due to insufficient seasonal representation and missing core parameters. Missing core parameters: dissolved metals (copper, cadmium, and zinc), and total mercury. All samples were collected in March, April, and May.
Oak Creek headwaters - West Fork Oak Creek AZ15060202-019 A&Ww, FC, FBC, DWS, Agl, Agl Unique Water	ADEQ TMDL Program Above Pumphouse Wash VROAK025.3	1998 - 4 partial suites	No exceedances					
	ADEQ TMDL Program Below Pumphouse Wash VROAK025.2	1998 - 4 partial suites	Turbidity NTU	10 (A&Ww)	1 - 20	2 of 4		
	ADEQ Biocriteria Program Below Cave Springs Camp VROAK023.21 100608	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive Agl Inconclusive Agl Inconclusive	1998 9 samples 5 sampling events	Turbidity NTU	10 (A&Ww)	1 - 20	2 of 8	Inconclusive (see comment)	ADEQ collected 9 samples at 3 sites in 1998. Assessed as "inconclusive" and placed on the Planning List due to exceedances of the former turbidity standard and missing core parameters. Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed. Missing core parameters: total fluoride, total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, arsenic, chromium, lead, manganese, and copper).
Oak Creek At Slide Rock State Park only AZ15060202-018B A&Ww, FC, FBC, DWS, Agl, Agl Unique Water	ADEQ TMDL Program Above Slide Rock VROAK020.03	1998 - 1 pH, nutrients	No exceedances					
	Slide Rock State Park <i>Escherichia coli</i> Monitoring Upstream VROAK020.00A	1998 - 2002 685 <i>Escherichia coli</i> samples only	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max)	0 - 2491	39 of 685		
	Slide Rock State Park <i>Escherichia coli</i> Monitoring Mid-slide VROAK020.00B	1998 - 2002 680 <i>Escherichia coli</i> samples only	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max)	0 - 2491	32 of 680		

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	Slide Rock State Park <i>Escherichia coli</i> Monitoring Large Pool VROAK020.00C	1998 - 2002 682 <i>Escherichia coli</i> samples only	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max)	0 - 2491	43 of 679		
	Slide Rock State Park Foot Bridge <i>Escherichia coli</i> Monitoring VROAK020.00D	1998 - 2002 682 <i>Escherichia coli</i> samples only	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max)	0 - 2491	101 of 682		
	Slide Rock State Park at Highway Bridge <i>Escherichia coli</i> Monitoring VROAK020.00E	1998 - 2002 679 <i>Escherichia coli</i> samples only	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max)	0 - 2491	54 of 682		
	ADEQ/TMDL Below Slide Rock VROAK019.97	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Not attaining DWS Inconclusive Agl Inconclusive Agl Inconclusive	1998-2002 3408 <i>Escherichia coli</i> samples 2 other sampling events	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample maximum)	0 - 2491	269 of 3408 (more than 2 exceedances in the last 3- year period)	Not attaining	ADEQ collected 2 samples at 2 sites in 1998. Slide Rock State Park collected a total of 3408 <i>Escherichia coli</i> samples at 5 sites in 1998-2002. <i>Escherichia coli</i> TMDLs were approved by EPA in 1999. Assessed as "not attaining" due to <i>Escherichia coli</i> exceedances and placed on the Planning List for TMDL follow-up monitoring and for missing core parameters. Also placed on the Planning List due to beach closures following elevated levels of <i>Escherichia coli</i> . Beach closures have occurred every summer during the assessment period. Missing core parameters: total fluoride, total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, arsenic, chromium, lead, manganese, and copper).
Oak Creek Below Slide Rock State Park- Dry Creek AZ15080202-018C A&Ww, FC, FBC, DWS, Agl, Agl Unique Water	ADEQ TMDL Program Above Munds Creek VROAK018.3	1998 - 3 partial suites	No exceedances					
	ADEQ TMDL Program Below Munds Creek VROAK018.1	1998 - 3 partial suites	No exceedances					
	ADEQ Ambient Monitoring below Grasshopper Point VROAK018.57 100459	1998 - 3 partial suites	No exceedances					

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ Ambient Monitoring At Highway 179 bridge VROAK014.54 100460	1998 - 3 full suites	No exceedances					
	ADEQ Ambient Monitoring At Chavez Crossing VROAK013.11 100461	1998 - 3 full suites	No exceedances					
	ADEQ TMDL Program Below Redrock Crossing VROAK011.4	1998 - 1 partial suites (2 samples, only 2 days apart)	No exceedances					
	ADEQ Biocriteria Program At Red Rock State Park VROAK010.29 100612	1999 - 1 full suite	No exceedances					
	ADEQ Fixed Station Network At Redrock Crossing VROAK009.33 100492	1998 - 4 full suites 1999 - 4 full suites 2000 - 4 full suites 2001 - 4 full suites 2002 - 4 full suites	Beryllium (total) µg/L	4.0 (DWS, FBC)	<0.5 - 4.1	1 of 20		
			Manganese (total) µg/L	980 (DWS)	<50 - 1300	1 of 20		
			Total Nitrogen mg/L	2.5 Unique Water (A&Ww)	<0.5 - 4.97	1 of 19		
			Total Phosphorus mg/L	0.3 Unique Water (A&Ww)	< 0.02 - 1.5	1 of 20		
			Turbidity NTU	50 (A&Ww)	1 - >1000	2 of 20		
	Summary Row A&Ww Attaining FC Attaining FBC Attaining DWS Attaining AgI Attaining AgL Attaining	1998 - 2002 37 samples 25 sampling events	Beryllium (total) µg/L	4.0 (DWS, FBC)	<0.5 - 4.1	1 of 29	Attaining	ADEQ collected 37 samples at 8 sites in 1998-2002. Assessed as "attaining all uses."
			Manganese (total) µg/L	980 (DWS)	<50 - 1300	1 of 29	Attaining	
			Total Nitrogen mg/L	2.5 Unique Water (A&Ww)	<0.5 - 4.97	1 of 37	Attaining	
			Total Phosphorus mg/L	0.3 Unique Water (A&Ww)	< 0.02 - 1.5	1 of 37	Attaining	
			Turbidity NTU	50 (A&Ww)	1 - >1000	2 of 37	Attaining	

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Oak Creek Dry Creek - Spring Creek AZ15060202-017 A&Ww, FC, FBC, DWS, AgL, AgL Unique Water	ADEQ TMDL Program At Page Springs Bridge VROAK006.4	1998 - 1 partial suite	No exceedances					
	ADEQ Ambient Monitoring Below Page Springs VROAK005.91 100613	1999 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgL Inconclusive AgL Inconclusive	1998 - 1999 2 sampling events	No exceedances				Not assessed	Insufficient monitoring data to assess.
Oak Creek Spring Creek - Verde River AZ15060202-016 A&Ww, FC, FBC, DWS, AgL, AgL Unique Water	ADEQ TMDL Program Above Mormon Crossing VROAK004.9	1998 - 1 partial suite	No exceedances					Missing core parameters: <i>Escherichia coli</i> , total fluoride, total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, arsenic, chromium, lead, manganese, and copper).
	ADEQ TMDL Program Above Verde River VROAK000.1	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgL Inconclusive AgL Inconclusive	1998 2 samples 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
Oak Creek, <u>West Fork</u> headwaters - Oak Creek AZ15060202-020 A&Wc, FC, FBC, AgL Unique Water	ADEQ Biocriteria Program Above Fourth Trail Crossing VRWOK000.64 100693	1998 - 1 partial suite	No exceedances					Missing core parameters: <i>Escherichia coli</i> , total boron, dissolved metals (copper and zinc), and total metals (mercury, copper, and lead).
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
Pumphouse Wash headwaters - Oak Creek AZ15060202-442 A&Ww, FC, FBC (tributary rule)	ADEQ TMDL Program Above Kachina Village VRPMW008.4	1998 - 3 partial suites	Total Phosphorus mg/L	1.0 (A&Ww single sample maximum)	0.21 - 2.04	1 of 3		
			Turbidity NTU	50 (A&Ww)	44 - 690	2 of 3		
	ADEQ TMDL Program Below Kachina Village VRPMW007.5	1998 - 3 partial suites	No exceedances					

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ TMDL Program Above Oak Creek VRPMW002.7	1998 - 4 partial suites	No exceedances					
	ADEQ Fixed Station Network Below Highway 89A bridge VRPMW002.63 100460	1998 - 1 field, dissolved copper and cadmium	No exceedances					
	Summary Row	1998	Total Phosphorus mg/L	1.0 (A&Ww single sample maximum)	0.214 - 2.04	1 of 10	Attaining	ADEQ collected 11 samples at 4 sites in 1998. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: dissolved metals (copper, cadmium, and zinc), and total mercury.
	A&Ww Inconclusive FC Inconclusive FBC Attaining	11 samples 5 sampling events	Turbidity NTU	50 (A&Ww)	44 - 690	2 of 10	Attaining	
Roundtree Canyon Creek headwaters - Tangle Creek AZ15060203-853 A&Ww, FC, FBC, AgL	ADEQ Biocriteria Program 3 miles above Tangle Creek VRROU001.79 100631	1998 - 1 partial suite	No exceedances					Missing core parameters: <i>Escherichia coli</i> , dissolved zinc, and total metals (mercury, copper and lead).
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
Spring Creek Coffee Creek - Oak Creek AZ15060202-022 A&Ww, FC, FBC, AgL, AgL	ADEQ Biocriteria Program Near road crossing VRSPN001.36 100650	1998 - 1 partial suite	No exceedances					Missing core parameters: <i>Escherichia coli</i> , total boron, dissolved zinc, total metals (mercury, manganese, copper, and lead).
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
Sycamore Creek Cedar Creek - Verde River AZ15060202-026 A&Ww, FC, FBC, AgL, AgL	ADEQ Ambient Monitoring Below Summers Springs VRSYW001.4 100199	1998 - 1 partial suite	No exceedances					Missing core parameters: <i>Escherichia coli</i> , total boron, dissolved zinc, and total metals (mercury, manganese, copper and lead).
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
Sycamore Creek headwaters - Verde River AZ15060203-055 A&Ww, FC, FBC, AgL	ADEQ Biocriteria Program Tributary of Horseshoe Res. VRSYH000.16 100656	1998 - 1 partial suite	No exceedances					Missing core parameters: dissolved oxygen, <i>Escherichia coli</i> , field pH, dissolved zinc, and total metals (mercury, copper, and lead).

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
Verde River Granite Creek - Hell Canyon AZ15060202-052 A&Ww, FC, FBC, AgL, AgL	ADEQ Biocriteria Program East of Paulden VRVER095.73 100764	1998 - 1 partial suite	No exceedances					Missing core parameters: <i>Escherichia coli</i> , total boron, dissolved zinc, and total metals (mercury, manganese, copper, and lead).
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
Verde River Hell Canyon - unnamed reach 15060202-065 AZ15060202-038 A&Ww, FC, FBC, AgL, AgL	ADEQ Ambient Monitoring Above Perkinsville bridge VRVER095.54 100672	1999 - 1 full suite	No exceedances					Missing core parameter: <i>Escherichia coli</i>
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive AgL Inconclusive	1999 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
Verde River unnamed reach 15060202-065 - Railroad Draw AZ15060202-037 A&Ww, FC, FBC, AgL, AgL	USGS Special study VRVER095.74 101569	2002 - 1 nutrients + selenium (dissolved)	No exceedances					
	ADEQ Ambient Monitoring Below Perkinsville Bridge VRVER095.65 100487	1998 - 1 full suite 1999 - 6 full suites 2000 - 3 full suites 2001 - 3 full + 1 partial suite 2002 - 3 full suites	Arsenic (total) µg/L	50 (FBC)	5 - 240	1 of 17		
			Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.7 - 10.3 (76 - 144 %)	1 of 16		
			<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	0 - 2,300	1 of 15		Exceedance during high flow event
			Mercury (total) µg/L	0.6 (FC)	<0.5 - 0.79	1 of 17		
			Turbidity NTU	50 (A&Ww)	7 - 677	3 of 17		

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row	1998-2002	Arsenic (total) µg/L	50 (FBC)	5 - 240	1 of 17	Attaining	ADEQ and USGS collected 18 samples at 2 sites in 1998-2002. Assessed as "attaining all uses."
	A&Ww	18 samples	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.7 - 10.3 (76 - 144 %)	1 of 16	Attaining	
	FC	18 sampling events	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	0 - 2,300	1 of 15 events (none in last 3 years)	Attaining	
	FBC		Mercury (total) µg/L	0.6 (FC)	<0.5 - 0.79	1 of 17	Attaining	
	AgI		Turbidity NTU	50 (A&Ww)	7 - 677	3 of 17	Attaining	
Verde River Sycamore Creek - Oak Creek AZ15060202-025 A&Ww, FC, FBC, AgI, AgL	USGS Fixed Station #09504000 Near Clarkdale VRVER091.61 100738	1998 - 6 full suites 1999 - 4 full suites 2000 - 4 full suites 2001 - 4 full suites 2002 - 5 full suites	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	0 - 240	1 of 23		Lab reporting limits for 22 other mercury samples too high to assess chronic standards.
			Mercury (dissolved) µg/L	0.01 (A&Ww chronic)	<0.1 - 0.1	1 of 1		
			Turbidity NTU	50 (A&Ww)	0.76 - 61	1 of 23		
	USGS Monitoring Below Tapco Substation VRVER087.70 101552	1999 - 1 full suite	No exceedances					
	USGS Monitoring Above sewage pond VRVER086.92 101549	1999 - 1 full suite	No exceedances					
	USGS Monitoring At sewage pond VRVER086.81 101548	1999 - 1 full suite	No exceedances					
	USGS Monitoring Below diversion dam VRVER086.62 101550	1999 - 1 full suite	No exceedances					
	Phelps Dodge Permit Instream Monitoring Upstream of Tuzigoot seeps VRVER085.61	1998 - 3 partial suites 1999 - 4 partial suites 2000 - 4 partial suites 2001 - 4 partial suites 2002 - 4 partial suites	Lead (total) µg/L	15 (FBC)	<5 - 40	2 of 19		

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	Phelps Dodge Permit Instream Monitoring Below Tuzigoot seeps VRVER085.60	1998 - 3 partial suites 1999 - 4 partial suites 2000 - 4 partial suites 2001 - 4 partial suites 2002 - 4 partial suites	No exceedances					
	USGS Monitoring At Tuzigoot Bridge VRVER085.49 101546	1999 - 1 full suite	No exceedances					
	USGS Monitoring Above Dead Horse State Park VRVER084.38 101544	1999 - 1 full suite	No exceedances					
	ADEQ Ambient and Biocriteria At Dead Horse State Park VRVER84.38 100482	1999 - 1 full suite	No exceedances					
	USGS Monitoring Below Dead Horse State Park VRVER084.42 101545	1999 - 1 full suite	No exceedances					
	Summary Row	1998 - 2002	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	0 - 240	1 of 25 events (in 2000)	Inconclusive	ADEQ, USGS, and Phelps Dodge collected a total of 69 samples at 11 sites in 1998-2002. Assessed as "attaining some uses" and placed on the Planning List due to mercury and <i>Escherichia coli</i> exceedances.
	A&Ww Inconclusive FC Attaining FBC Inconclusive Agl Attaining AgL Attaining	69 samples 34 sampling events	Lead (total) µg/L	15 (FBC)	<5 - 40	2 of 63	Attaining	
			Mercury (dissolved) µg/L	0.01 (A&Ww chronic)	<0.1 - 0.1	1 of 1 event (Insufficient events)	Inconclusive	
			Turbidity NTU	50 (A&Ww)	0.76 - 61	1 of 25	Attaining	
Verde River Oak Creek - Beaver Creek AZ15060202-015 A&Ww, FC, FBC, Agl, AgL	ADEQ TMDL Program Below Oak Creek VRVER078.8	1998 - 1 partial suite	No exceedances					Missing core parameter: <i>Escherichia coli</i> .
	ADEQ Biocriteria & TMDL At 1000 Trails VRVER078.76 100481	1999 - 1 partial suite	No exceedances					

TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ Biocriteria & TMDL Program Across from Reservation VRVER075.14 100718	1999 - 1 partial suite	No exceedances					
	Summary Row A&Ww Not attaining FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive	1998 - 1999 3 samples 2 sampling events	No exceedances				Not assessed	Insufficient monitoring data to assess (only 2 sampling events). A turbidity TMDL was approved by EPA in 2002. Reach will remain "not attaining" until turbidity or suspended sediment concentration (SSC) monitoring indicate designated uses are being attained.
Verde River HUC border 15060203 - West Clear Creek AZ15060203-027 A&Ww, FC, FBC, Agl, AgL	ADEQ Biocriteria Program Above West Clear Creek VRVER066.74 100723	1999 - 1 partial suite	No exceedances					
	USGS Fixed Station #09505570 Above West Clear Creek VRVER066.64 100750	1998 - 5 full suites	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	60 - 240	1 of 5		
	Summary Row A&Ww Inconclusive FC Attaining FBC Inconclusive Agl Attaining AgL Attaining	1998 - 1999 6 sampling events	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	60 - 240	1 of 5 events (In 1998, do not have 3 years sampling after)	Inconclusive	ADEQ and USGS collected 6 samples at 2 sites in 1998-1999. Assessed as "attaining some uses" and placed on the Planning List due to <i>Escherichia coli</i> exceedance and missing cora parameters: dissolved metals (copper, cadmium, and zinc).
Verde River West Clear Creek - Fossil Creek AZ15060203-025 A&Ww, FC, FBC, Agl, AgL	USGS TMDL Monitoring At Beasley Flat VRVER064.80 100677	1999 - 1 partial suite 2002 - 1 partial suite	Turbidity NTU	50 (A&Ww)	77	1 of 1		Also exceeded SSC standard (SSC =133, standard is 80), but lacked minimum of 4 samples to calculate geometric mean.
	ADEQ Fixed Station At Beasley Flat VRVER064.68 100477	1998 - 1 full suite 1999 - 4 full suites 2000 - 3 full suites 2001 - 4 full suites 2002 - 4 full suites	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<2 - 1,125	1 of 15		
			Selenium µg/L	2 (A&Ww chronic)	<5 - 5.4	1 of 1		Lab reporting limits for 15 other samples were too high to assess chronic standard.
			Turbidity NTU	50 (A&Ww)	<5 - 998	5 of 16		Only 1 SSC sample collected.

TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row	1999 - 2000 18 samples	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<2 - 1,125	1 of 16 events (in 1999, 3 years sampling OK after)	Attaining	<p>ADEQ and USGS collected 18 samples at 2 sites in 1999-2000. A turbidity TMDL for reaches immediately upstream of this reach was approved by EPA in 2002. Assessed as "not attaining" because the turbidity loading on this reach will be addressed by the turbidity TMDL for the Verde River.</p> <p>Although current turbidity data are inconclusive, the reach will remain "not attaining" until turbidity or suspended sediment concentration (new sediment standard) data indicate designated uses are being attained.</p> <p>Also placed on the Planning List due to selenium exceedances.</p>
	A&Ww Not attaining FC Attaining FBC Attaining Agl Attaining AgL Attaining		Selenium µg/L	2 (A&Ww chronic)	<5 - 5.4	1 of 1 event (insufficient events)	Inconclusive	
			Turbidity NTU	50 (A&Ww)	1 - 998	6 of 17	Inconclusive (Not attaining)	
Verde River Tangle Creek - Ister Flat AZ15060203-018 A&Ww, FC, FBC, Agl, AgL	Univ. of Az. Reservoir Project Above Horseshoe Reservoir VRVER036.68	2002 - 2 partial suites	Turbidity NTU	50 (A&Ww)	4.7 - >1000	1 of 2		
	USGS Fixed Station #09508500 Below Tangle Creek VRVER036.48 100740	1998 - 5 full suites 1999 - 6 full suites 2000 - 4 full suites 2001 - 4 full suites 2002 - 4 full suites	<i>Escherichia coli</i> CFU/100 mg/L	235 (FBC)	<1.0 - 770	1 of 22		
			Turbidity NTU	50 (A&Ww)	0.2 - 170	4 of 22		
	SRP Ambient Monitoring Below Tangle Creek VRVER032.74	1998 - 15 partial suites 1999 - 14 partial suites 2000 - 15 partial suites 2001 - 11 partial suites 2002 - 12 partial suites	Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	<10 - 30	1 of 58		
	Summary Row	1998 - 2002 92 samples 85 sampling events	Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	<10 - 30	1 of 58 events (2% exceed)	Attaining	<p>University of Arizona, USGS, and SRP collected 92 samples at 3 sites in 1998-2002. Turbidity exceedances indicate impairment based on the former turbidity standard. Assessed as "not attaining" until sufficient turbidity or suspended sediment concentration (SSC) data are collected to make an assessment of "attaining" or "impaired."</p>
	A&Ww Not attaining FC Attaining FBC Inconclusive Agl Attaining AgL Attaining		<i>Escherichia coli</i> CFU/100 mg/L	235 (FBC)	<1.0 - 770	1 of 24 events (in 2000)	Inconclusive	
			Turbidity NTU	50 (A&Ww)	0.3 - 170	5 of 24	Not attaining (see comment)	
Verde River Horseshoe Dam - Alder Creek AZ15060203-008 A&Ww, FC, FBC, Agl, AgL	AGFD Ambient Monitoring Below Horseshoe Reservoir VRVER030.17	1999 - 1 partial suite	No exceedances					
	Univ. of Az. Reservoir Project Below Horseshoe Reservoir VRVER028.85	2002 - 2 partial suites	No exceedances					

TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	AGFD Ambient Monitoring Below Mesquite Rec. Area VRVER028.70	1999 - 1 partial suite	No exceedances					
	ADEQ Ambient Monitoring Below Horseshoe Reservoir VEVER027.54 100831	1999 - 1 full suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Attaining	1999 - 2002 5 sampling events	No exceedances					ADEQ, AGFD, and University of Arizona collected 5 samples at 4 sites in 1999 - 2002. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , total boron, dissolved metals (copper, cadmium, and zinc), and total mercury.
Verde River Bartlett Dam - Camp Creek AZ15060203-004 A&Ww, FC, FBC, DWS, AgL, AgL	Univ. of Az. Reservoir Project Below Bartlett Lake VRVER018.51	2002 - 2 partial suites	No exceedances					
	USGS Fixed Station #09510000 Below Bartlett Dam VRVER018.13 100741	1999 - 4 full suites 2000 - 6 full suites 2001 - 5 full suites 2002 - 3 full suites	No exceedances					
	SRP Routine Monitoring Below Bartlett Dam VRVER017.55	1998 - 10 partial suites 1999 - 13 partial suites 2000 - 13 partial suites 2001 - 11 partial suites 2002 - 12 partial suites	Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	<10 - 55	4 of 57		
				varies by hardness (A&Ww acute)	<10 - 55	1 of 57		
			Selenium (dissolved) µg/L	2 (A&Ww total, chronic)	<5 - 13	4 of 4		Lab reporting limits for 56 other selenium samples were too high to assess the chronic standard.
	Summary Row A&Ww Inconclusive FC Attaining FBC Attaining DWS Attaining Agl Attaining AgL Attaining	1998 - 2002 79 samples	Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	<10 - 55	4 of 80 events (5% exceed)	Attaining	University of Arizona, USGS, and SRP collected 79 samples at 3 sites in 1998 - 2002. Assessed as "attaining some uses" and placed on the Planning List due to selenium exceedances.
				varies by hardness (A&Ww acute)	<10 - 55	1 of 80 events (in 1999, 3 years OK after)	Attaining	
			Selenium (dissolved) µg/L	2 (A&Ww total, chronic)	<5 - 13	4 of 23 events (17% exceed)	Inconclusive	

enforcement
std.
chronic =
geom of
last 4 samples

events - A&W
chronic
FBC

with 7 day
bits in reach of 2 exceedances = 1 exceedance/event

24710 = 10'
n7 2590

TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Verde River Camp Creek - Sycamore Creek 15060203-003 A&Ww, FBC, FC, DWS, Agl, Agl	USGS Fort McDowell Study Fort McDowell north boundary VRVER011.34 101522	1998 - 2 partial suites 1999 - 4 partial suites	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Attaining DWS Inconclusive Agl Inconclusive Agl Inconclusive	1998 - 1999 6 sampling events	No exceedances					USGS collected 6 samples in 1998-1999. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: dissolved cadmium and total metals (mercury, arsenic, chromium, lead, manganese, and copper).
Verde River Sycamore Creek - Salt River 15060203-001 A&Ww, FBC, FC, DWS, Agl, Agl	Univ. of AZ - Reservoir Project for ADEQ Above Salt River confluence VRVER003.18	2002 - 1 partial suite	No exceedances					
	AGFD Ambient Monitoring Above Salt River confluence VRVER000.18	1999 - 2 partial suites	No exceedances					
	Summary Row A&Ww Inconclusive FBC Inconclusive FC Inconclusive DWS Inconclusive Agl Inconclusive Agl Inconclusive	1999 - 2002 3 sampling events	No exceedances					AGFD and University of Arizona collected 3 samples in 1999-2002. Assessed as "Inconclusive" and placed on the Planning List due to insufficient monitoring events for all core parameters (only 1 or 2 samples for each).
West Clear Creek Meadow Canyon - Verde River AZ15060203-026B A&Ww, FC, FBC, Agl, AgL	ADEQ Biocriteria Program Above Bull Pen Ranch VRWCL006.09 100204	1998 - 1 partial suite 1999 - 1 partial suite	No exceedances					
	USGS Fixed Station #09505800 Near Camp Verde VRWCL005.79 100749	1998 - 12 partial suites 1999 - 12 partial suites 2000 - 3 partial suites 2001 - 9 partial suites 2002 - 6 partial suites	No exceedances					
	ADEQ Biocriteria Program At campground VRWCL002.91 100689	1999 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive	1998-2002 45 samples	No exceedances					ADEQ and USGS collected 45 samples at 3 site in 1998-2002. Assessed as "Inconclusive" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , dissolved zinc, total boron, and total metals (mercury, manganese, copper, and lead).

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STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Wet Beaver Creek Long Canyon - Rarick Canyon AZ15060202-004 A&Wc, FC, FBC, Agl, AgL	ADEQ Biocriteria &TMDL Above USGS gage at Rimrock VRWBV006.79 100765	1998 - 1 partial suite 1999 - 4 partial suites	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.6 - 9.5 (75 - 100%)	1 of 4		Low dissolved oxygen due to naturally occurring ground water upwelling, and not anthropogenic causes. Not included in final assessment.
	ADEQ Biocriteria Program At campground VRWBV005.06 100684	1999 - 1 partial suite	No exceedances					
	ADEQ TMDL Program At camp ground VRBEV004.95	1999 - 5 partial suites	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.7 - 9.4 (87 - 93%)	1 of 3		
	ADEQ TMDL Program At Montezuma Well VRWBV003.18	1999 - 4 partial suites	No exceedances					
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive	1998 - 2002 15 samples 7 sampling events	No exceedances					
Wet Beaver Creek Rarick Canyon - Dry Beaver Creek AZ15060202-003 A&Wc, FC, FBC, Agl, AgL	USGS Ambient Monitoring VRWBV003.16 101543	2002 - 1 partial suite	No exceedances					Missing core parameters: turbidity/SSC, <i>Escherichia coli</i> , dissolved metals (copper, cadmium, and zinc), and total metals (mercury, manganese, copper, and lead).
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive	2002 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
LAKE MONITORING DATA								
Bartlett Lake AZL15060203-0110 A&Ww, FC, FBC, DWS, Agl, AgL	ADEQ Lakes Program VRBAR-A (deepest) 100009	1998 - 3 partial suites 1999 - 3 partial suites 2000 - 2 partial suites 2001 - 1 full + 1 partial suites 2002 - 1 full suite	No exceedances					All 4 <i>Escherichia coli</i> samples were collected by ADEQ on the same date (one event).
	ADEQ Lakes Program VRBAR-B (mid lake) 100010	1998 - 3 full suites 1999 - 3 full suites 2000 - 1 partial suites 2001 - 2 full suites 2002 - 1 full suite	No exceedances					

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	ADEQ Lakes Program VRBAR-C 100011	1998 - 3 full suites 1999 - 3 full suites 2000 - 1 partial suites 2001 - 2 full suites 2002 - 1 full suite	Turbidity NTU	25 (A&Ww)	3 - 28	1 of 7		The turbidity exceedance at site C was due to an upstream dam release and natural mixing flows in this area of the lake; therefore, the turbidity was not included in the final assessment.
	ADEQ Lakes Program VRBAR-NTU1 thru NTU5 100980	1999 - Turbidity + field at 5 sites 2000 - Turbidity + field at 5 sites	No exceedances					
	ADEQ Lakes Program VRBAR - MAR1 (marina) 100986	2001 - 1 field, MTBE 2002 - 1 MTBE	No exceedances					
	ADEQ Lakes Program VRBAR - SW (swim area) 101321	2002 - 1 <i>Escherichia coli</i>	No exceedances					
	AGFD Ambient Monitoring VRBAR - DAM SITE	2000 - 1 partial suite	No exceedances					
	AGFD Ambient Monitoring VRBAR - MID LAKE	2000 - 1 partial suite	No exceedances					
	AGFD Ambient Monitoring VRBAR - BARTLETT FLATS	2000 - 1 partial suite	No exceedances					
	Univ. of Az. Reservoir Project Bartlett Lake VRBAR - A	1999 - 4 partial suites 2000 - 8 partial suites 2002 - 2 full suites	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, Agl)	7.7 - 9.3	1 of 14		
	Summary Row A&Ww Inconclusive FC Attaining FBC Inconclusive DWS Attaining Agl Attaining Agl Attaining	1998 - 2002 61 samples 31 sampling events	pH (SU)	6.5 - 9.0 (A&Ww, FBC, Agl, Agl)	7.7 - 9.3	1 of 60	Attaining	ADEQ, AGFD, and University of Arizona collected 61 samples at 14 sites in 1998-2002. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper, cadmium, and zinc).
Fountain Lake AZL15060203-0003 A&Ww, FBC, FC (tributary rule)	USGS Special Investigation in Fountain Hills, Arizona	1998 - 1 partial suite	No exceedances					Missing core parameters: dissolved oxygen, turbidity/SSC, <i>Escherichia coli</i> , field pH, dissolved metals (copper, cadmium, and zinc), and total mercury. Lab reporting limits for dissolved copper, cadmium, and zinc were too high to assess standards.
	Summary Row A&Ww Inconclusive FBC Inconclusive FC Inconclusive	1998 1 sampling event	No exceedances				Not assessed	Insufficient monitoring data to assess.
Granite Basin Lake AZL15060202-0580 A&Ww, FC, FBC, Agl, AgL	ADEQ Lakes Program VRGBL - A (deepest) 100024	1999 - 4 partial suites 2002 - 3 partial suites	Ammonia mg/L	varies by temperature and pH (A&Ww chronic)	0.03 - 7.65	1 of 6		Lab reporting limits for dissolved metals were too high to assess standards.
			Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	3.6 - 11.2 (39%-142%)	2 of 6		
			pH (low) SU	6.5 - 9.0 (A&Ww, FBC, Agl, Agl)	7.0 - 9.7	2 of 6		

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STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	ADEQ Lakes Program VRGBL - B (mid lake) 100025	1999 - 3 full + 1 partial suite	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	3.9 - 10.2 (45%-127%)	1 of 3		
			pH (high) SU	6.5-9.0 (A&Ww, FBC, AgL, AgI)	7.1 - 9.5	1 of 3		
	ADEQ Lakes Program VRGBL - BR (boat ramp) 101398	2002 - 1 <i>Escherichia coll</i>	No exceedances					
	Summary Row	1998-2002 12 samples 8 sampling events	Ammonia mg/L	varies by hardness (A&Ww chronic)	0.03 - 7.65	1 of 6 events (17% exceed)	Inconclusive	ADEQ collected 12 samples at 3 sites in 1998-2002. *EPA placed this lake on the 2002 303(d) List for dissolved oxygen based on 3 exceedances in 7 samples. Although Arizona's Impaired Waters Rule requires a minimum of 5 exceedances in 20 samples to based a listing decision for dissolved oxygen, once listed the lake cannot be delisted until a TMDL is completed or dissolved oxygen data indicate designated uses are being attained. Therefore, this lake is assessed as "impaired" due to low dissolved oxygen. Placed on the Planning List due to high pH, ammonia exceedances, and missing core parameters: <i>Escherichia coll</i> and dissolved metals (copper, cadmium, and zinc).
	A&Ww Impaired* FC Attaining FBC Inconclusive AgI Inconclusive AgL Inconclusive		Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	3.6 - 11.2 (49-142%)	3 of 9	Inconclusive (Impaired*)	
			pH (high) SU	6.5 - 9.0 (A&Ww, FBC, AgI, AgL)	7.0 - 9.5	3 of 9	Inconclusive	
	Horseshoe Reservoir AZL15060203-0620 A&Ww, FC, FBC, AgI, AgL	Univ. of Az. Reservoir Project VRHSR - A (deepest)	Turbidity NTU	25 (A&Ww)	2 - 90	3 of 8		
		Univ. of Az. Reservoir Project VRHSR - B (mid lake)	pH SU	6.5 - 9.0 (A&Ww, FBC, AgI, AgL)	8.2 - 9.3	1 of 7		
			Turbidity NTU	25 (A&Ww)	0.8 - 32	1 of 7		
		Univ. of Az. Reservoir Project VRHSR - C	No exceedances					
	AGFD Ambient Monitoring VRHSR - East Spill Tower	1999 - 1 partial suite	No exceedances					

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	Summary Row	1999 - 2000	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	8.2 - 9.3	1 of 19	Attaining	University of Arizona and AGFD collected 19 samples at 4 sites in 1999 - 2000. Assessed as "Inconclusive" and placed on the Planning List due to missing core parameters and exceedances of the former turbidity standard. Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed. Missing core parameters: <i>Escherichia coli</i> , total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, manganese, copper, and lead).
	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive	19 samples 9 sampling events	Turbidity NTU	25 (A&Ww)	0.8 - 90	4 of 18	Inconclusive (see comment)	
J D Dam Lake AZL15060202-0700 A&Wc, FBC, FC, Agl, AgL	ADEQ Lakes Program VRJDD - A (deepest) 101286	2001 - 4 partial suites	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	6.2 - 8.9	1 of 4		Used worst case pH of 1 of 10 samples taken. Algal bloom noted at the time.
	ADEQ Lakes Program VRJDD - BR (boat ramp) 101318	2002 - 1 <i>Escherichia coli</i>	No exceedances					
	AGFD Ambient Monitoring VRJDD - M (mid lake)	2001 - 1 partial suite	No exceedances					
	Summary Row A&Wc Inconclusive FC Attaining FBC Inconclusive Agl Attaining AgL Attaining	2001 - 2002 6 sampling events	pH SU	6.5 - 9.0 (A&Ww, FBC)	6.2 - 8.9	1 of 5	Inconclusive	ADEQ and AGFD collected 6 samples in 2001 - 2002. Assessed as "attaining some uses" and placed on the Planning List due to low pH and missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper and cadmium).
Pecks Lake AZL15060202-1060 A&Wc, FC, FBC, Agl, AgL	ADEQ Lakes Program VRPEC-A 100063	1999 - 4 partial suites 2000 - 1 partial suite 2002 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	5.0 - 11.7	1 of 5		
	ADEQ Lakes Program VRPEC-AA 100511	1999 - 1 partial suite 2000 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	2.0 - 8.3 (18 - 85%)	1 of 2		
	ADEQ Lakes Program VRPEC-F 1005113	1999 - 2 partial suites 2002 - 1 partial suite	No exceedances					
	Summary Row A&Wc Not attaining FC Attaining FBC Inconclusive Agl Attaining AgL Attaining	1999 - 2002 11 samples 6 sampling events	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	2 - 11.7 (18 - 85%)	2 of 7	Inconclusive (Not attaining)	ADEQ collected 11 samples at 3 sites in 1999-2002. A nutrient TMDL to address dissolved oxygen and pH problems was approved by EPA in 2000. Although current dissolved oxygen data are inconclusive, lake is assessed as "not attaining" until D.O. data indicate designated uses are being attained.
								Placed on the Planning List for TMDL follow-up monitoring and missing core parameters: <i>Escherichia coli</i> , turbidity, and dissolved metals (cadmium, copper, and zinc).

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Perkins Tank AZL15060202-1080 A&Wc, FC, FBC, AgL	ADEQ Lakes Program VRPER-A (deepest) 101296	2001 - 1 partial suites	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.2 - 6.6 (68 - 74%)	1 of 1		Missing core parameters: dissolved oxygen, turbidity, <i>Escherichia coli</i> , dissolved metals (copper, cadmium, and zinc), and total metals (mercury and lead).
			Turbidity NTU	10 (A&Wc)	3 - 13	1 of 1		
	AGFD Lakes Program VRPER-MID (mid lake)	2001 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	4.6 (60%)	1 of 1		
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	2001 2 sampling events	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	4.6 - 6.6 (65 - 106%)	2 of 2	Inconclusive	Insufficient monitoring data to assess. Placed on the Planning List due to low dissolved oxygen and exceedance of the former turbidity standard. Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed.
			Turbidity NTU	10 (A&Wc)	3 - 13	1 of 1	Inconclusive (see comment)	
Schole Lake AZL15060202-1350 A&Ww, FC, FBC, AgL	ADEQ Lakes Program VRSch-A (deepest) VRSch 101295	2001 - 3 partial suites 2002 - 1 full suite	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	4.8 - 7.7 (44 - 81%)	1 of 3		
			Lead (dissolved) µg/L	varies by hardness (A&Ww chronic)	4	1 of 1		
			Total nitrogen mg/L	3.0 (A&Ww)	2.47 - 3.36	2 of 4		
			Turbidity NTU	25 (A&Ww)	8 - 78	1 of 3		
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	2001 - 2002 4 sampling events	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	4.8 - 7.7 (44 - 81%)	1 of 3	Inconclusive	ADEQ collected 4 samples in 2001-2002. Assessed as "Inconclusive" and placed on the Planning List due to low dissolved oxygen and exceedances of lead, nitrogen, and the former turbidity standard. Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed. Also placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , dissolved metals (copper and cadmium), and total metals (mercury, copper, and lead).
			Lead (dissolved) µg/L	varies by hardness (A&Ww chronic)	4	1 of 1 event (insufficient events)	Inconclusive	
			Total nitrogen mg/L	3.0 (A&Ww)	2.47 - 3.36	2 of 4	Inconclusive	
			Turbidity NTU	25 (A&Ww)	8 - 78	1 of 3	Inconclusive (see comment)	
Stoneman Lake AZL15060202-1490 A&Wc, FC, FBC, AgL, AgL	ADEQ Lakes Program VRSTN-A (deepest) 100086	1999 - 5 partial suites 2001 - 1 partial suite	pH SU	6.5-9.0 (A&Wc, FBC, AgL, AgL)	8.7 - 9.9	2 of 4		
			Arsenic (total) µg/L	50 (FBC)	28 - 107	1 of 4		
	ADEQ Lakes Program VRSTN-B (mid lake) 100698	1999 - 4 partial suites 2001 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.7 - 14.5 (82 - 83%)	1 of 3		
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL, AgL)	8.8 - 9.6	2 of 5		

TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	ADEQ Lakes Program Central portion of backwaters VRSTN-MIDBW	1999 - 1 partial suite	No exceedances					
	ADEQ Lakes Program East portion, next to dike VRSTN - 1	1999 - 1 partial suite	pH SU	6.5 - 9.0 (A&Wc, FBC, Agl, AgL)	9.6	1 of 1		
	ADEQ Lakes Program North east bank of the dike VRSTN - 1E	1999 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.1 (85%)	1 of 1		Dissolved oxygen samples taken in backwater and back of dike are not representative of lake conditions. Low dissolved oxygen is due to natural ground water recharge. Not included in final assessment.
	ADEQ Lakes Program Northeast portion of backwater VRSTN - 1EE	1999 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	4.2 (47%)	1 of 1		
	ADEQ Lakes Program Central portion of north backwater VRSTN - 1S	1999 - 1 partial suite	pH SU	6.5 - 9.0 (A&Wc, FBC, Agl, AgL)	9.5	1 of 1		
	AGFD Lakes Monitoring VRSTN - MID (mid lake)	2001 - 1 partial suite	Arsenic µg/L	50 (FBC)	70.6	1 of 1		
	Summary Row A&Wc Not attaining FC Attaining FBC Not attaining Agl Not attaining AgL Not attaining	1999 - 2001 17 samples 7 sampling events	Arsenic µg/L	50 FBC	28 - 107	2 of 8	Inconclusive	ADEQ and AGFD collected 17 samples at 8 sites in 1998-2002. A nutrient TMDL to address low dissolved oxygen and high pH was approved by EPA in 2000. Assessed as "not attaining" due to pH exceedances. Although current pH data are inconclusive, this lake will remain "not attaining" until pH data indicate designated uses are being attained. Placed on the Planning List for arsenic exceedances, missing core parameter (<i>Escherichia coli</i>), and TMDL follow-up monitoring. Note that ADEQ is investigating establishing site-specific standards on this lake. Lake was completely dry in 2002.
			Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	4.2 - 14.5 (47 - 106%)	1 of 12	Attaining	
			pH SU	6.5 - 9.0 (A&Wc, FBC, Agl, AgL)	8.1 - 9.9	6 of 10	Inconclusive (Not attaining)	

TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Watson Lake AZL15060202-1590 A&Ww, FC, FBC, Agl, AgL	ADEQ Lakes Program VRWAT-A (deepest) 101353	2002 - 1 full + 1 partial suite	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.6 - 8.5 (64 - 85%)	1 of 2		
			Total nitrogen mg/L	3.0 (A&Ww)	1.24 - 4.85	1 of 2		
	ADEQ Lakes Program VRWAT - BR (boat ramp) 101397	2002 - 1 <i>Escherichia coli</i>	No exceedances					
	AGFD Ambient Monitoring VRWAT - BR (boat ramp)	2001 - 1 pH	No exceedances					
	AGFD Fish kill Investigation VRWAT-DAM (dam site)	2000 - 1 partial suite	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	9.8	1 of 1		Field notes indicate that the lake was full of algae. Golden shiner fish kill in 2000.
			Total nitrogen mg/L	3.0 (A&Ww)	4	1 of 1		
	AGFD Fish kill Investigation VRWAT - SO (south end)	2000 - 1 partial suite	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	9.5	1 of 1		
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive	2000 - 2002	Dissolved oxygen mg/L	> 6.0 90% saturation (A&Ww)	5.6 - 9.1 (64 - 85%)	1 of 5	Inconclusive	ADEQ and AGFD collected 6 samples at 5 sites in 2000 - 2002. Assessed as "inconclusive" and placed on the Planning List due to dissolved oxygen, nitrogen and pH exceedances, missing core parameters, and a fish kill in 2000. Missing core parameters: <i>Escherichia coli</i> , turbidity, total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, copper, and lead).
		6 samples 4 sampling events	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	7.5 - 9.8	2 of 5	Inconclusive	
			Total nitrogen mg/L	3.0 (A&Ww)	0.89 - 4.85	2 of 5	Inconclusive	
Whitehorse Lake AZL15060202-1630 A&Wc, FC, FBC, DWS, Agl, AgL	ADEQ Lakes Program VRWHH - A 100090	1999 - 3 full suites 2000 - 3 full suites 2001 - 6 full suites 2002 - 1 full suite	Ammonia mg/L	varies by hardness (A&Wc chronic)	0.11 - 1.24	1 of 11		Fish kill reported in 1999. Lab reporting limits for some dissolved metals samples were too high to assess standards.
			Dissolved oxygen mg/L	> 7.0 90% saturation (A&Wc)	0.6 - 10.4 (7-145%)	3 of 11		
			Nickel (total)	140 (DWS)	<10 - 210	1 of 11		
			pH SU	6.5 - 9.0 (A&Wc, FBC, Agl) 4.5 - 9.0 (Agl) 5.0 - 9.0 (DWS)	6.2 - 9.6	1 of 13 too high 1 of 13 too low		
			Turbidity NTU	10 (A&Wc)	21 - 46	9 of 9		
			Ammonia mg/L	varies by hardness (A&Wc chronic)	0.08 - 0.42	1 of 2		
	ADEQ Lakes Program VRWHH-B 100724	1999 - 3 full suites	Dissolved oxygen mg/L	> 7.0 90% saturation (A&Wc)	5.8 - 10.0 (73-148%)	1 of 3		
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL) 4.5 - 9.0 (Agl) 5.0 - 9.0 (DWS)	7.1 - 9.6	1 of 3		
			No exceedances					
	ADEQ Lakes Program VRWHH - BR (boat ramp) 101317	2002 - 1 <i>Escherichia coli</i>	No exceedances					

TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row	1999-2002	Ammonia mg/L	varies by temperature and pH (A&Wc chronic)	0.08 - 1.24	2 of 13 events (15% events)	Inconclusive	<p>ADEQ collected 17 samples at 3 sites from 1999-2002.</p> <p>*EPA placed this lake on the 2002 303(d) List for dissolved oxygen based on 5 exceedances in 11 samples. Although Arizona's Impaired Waters Identification Rule requires a minimum of 20 samples to base a listing decision for dissolved oxygen, the lake cannot be delisted until a TMDL is complete or dissolved oxygen data indicate designated uses are being attained. Therefore, the lake is assessed as "impaired."</p> <p>Lake is assessed as "not attaining" due to turbidity exceedances (see comment in Table 26 to follow).</p> <p>Placed on the Planning List due to:</p> <ol style="list-style-type: none"> 1. Ammonia exceedances, 2. A fish kill in 1999 that may be evidence of a narrative standard violation. 3. Missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper, cadmium, and zinc). 4. Exceedances of the former turbidity standard. Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed.
	A&Wc FC FBC DWS Agl AgL	Impaired* Inconclusive Inconclusive Attaining Attaining Attaining	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	5.75-9.98 (73-148%)	4 of 14	Inconclusive (Impaired)	
		17 samples 13 sampling events	Nickel (total)	140 (DWS)	<10 - 210	1 of 11	Attaining	
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL) 4.5 - 9.0 (Agl) 5.0 - 9.0 (DWS)	6.2 - 9.6	2 of 16 high 1 of 16 low	Attaining	
			Turbidity NTU	10 (A&Wc)	21 - 48	9 of 9	Inconclusive (Not attaining)	

TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
VERDE WATERSHED — STREAM ASSESSMENTS				
Apache Creek headwaters - Walnut Creek 8 miles AZ15060201-019	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List (no current monitoring data). Added in 2002 due to missing core parameters.		
Beaver Creek Dry Beaver Creek - Verde River 9 miles AZ15060202-002	A&Ww Not attaining FC Inconclusive FBC Inconclusive AgL Inconclusive Category 4D — Not attaining	On the Planning List due to: 1. Former turbidity standard exceedances (5 of 26 samples). Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed. 2. Missing core parameters: <i>Escherichia coli</i> , dissolved metals (cadmium, copper, and zinc), and total metals (mercury, copper, and lead).	Delist turbidity. Standard repealed in 2002. Assessed turbidity as "not attaining" and placed in category 4D. Although current turbidity data are inconclusive (5 of 26 samples exceed), reach will remain "not attaining" until sufficient turbidity or suspended sediment concentration (new sediment standard) data are collected to make an assessment of "attaining" or "impaired."	EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Bitter Creek Jerome WWTP - 2.5 miles below 3 miles AZ15060202-066B	A&Ww Inconclusive PBC Inconclusive AgL Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		
Bitter Creek, unnamed tributary of headwaters - Bitter Creek 7 miles AZ15060202-868	A&Ww Inconclusive FBC Inconclusive FC Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List (no current monitoring data). Added in 2002 due to past exceedances of <u>cadmium, copper, pH, and zinc</u> standards.		
Camp Creek headwaters - Verde River 19 miles AZ15060203-031	A&Ww Inconclusive FBC Inconclusive FC Inconclusive AgL Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Colony Wash headwaters - Fort McDowell Indian Reservation 3 miles AZ15060203-998	A&We Inconclusive PBC Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
East Verde River headwaters - Ellison Creek 8 miles AZ15060203-022A (Reach was split into coldwater and warmwater segments since the last assessment.)	A&Wc Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgI Inconclusive AgL Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List due to: 1. Insufficient monitoring events to assess (only 2 sampling events). 2. Former turbidity standard exceedances (2 of 2 samples). Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed.		

TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
East Verde River Ellison Creek - American Gulch 20 miles AZ15060203-022B (Reach was split into coldwater and warmwater segments since the last assessment.)	A&Ww Inconclusive FC Attaining FBC Attaining DWS Attaining Agl Attaining Agl Attaining Category 2 — Attaining Some Uses	On the Planning List due to <u>chronic selenium</u> exceedances (2 of 2 samples).	add Se	
East Verde River American Gulch - Verde River 25 miles AZ15060203-022C (Reach renamed as "C" because of split discussed above.)	A&Ww Attaining FC Attaining FBC Attaining DWS Inconclusive Agl Attaining Agl Attaining Category 2 — Attaining Some Uses	On the Planning List due to <u>boron</u> exceedances (4 of 20 samples). ADEQ is considering a Use Attainability Analysis for Domestic Water Source due to high levels of naturally occurring <u>arsenic</u> (7 of 23 samples exceeded standards).	add B add As	
Ellison Creek headwaters - East Verde River 11 miles AZ15060203-459	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List (no current monitoring data). Added in 2002 due to insufficient sampling events and missing core parameters.		
Fossil Creek headwaters - Verde River 20 miles AZ15060203-024	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 2 samples).		
Grande Wash headwaters - Ashbrook Wash 6 miles AZ15060203-991	A&Ww Inconclusive FBC Impaired FC Inconclusive Category 5 - Impaired	On the Planning List due to <u>missing core parameters</u> : dissolved cadmium, dissolved oxygen, turbidity/SSC, total mercury.	Add <u>Escherichia coli</u> to the 303(d) List due to exceedances 2 of 2 sampling events (occurred in 1999 and 2000). OK	
Granite Creek headwaters - Willow Creek 13 miles AZ15060202-059A (Reach was split into coldwater and warmwater segments since the last assessment. No current data in 059B.)	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 3 — Inconclusive	On the Planning List due to: 1. <u>Escherichia coli</u> exceedances (2 of 4 sampling events for single sample maximum in 2000, 1 overall geometric mean exceedance). 2. <u>Low dissolved oxygen</u> (4 of 6 samples). 3. <u>Chronic mercury</u> exceedances (1 of 2 sampling events). 4. No current turbidity data; however, added to the Planning List in 2002 due to exceedances of the former <u>turbidity</u> standard in 1 of 2 samples. Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed. 5. <u>Missing core parameters</u> : turbidity/SSC, dissolved metals (cadmium and copper), and total metals (mercury, manganese, copper, and lead).	add E.coli (100) DO	
Munds Creek headwaters - Oak Creek 17 miles AZ15060202-415	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Category 3 — Inconclusive	On the the Planning List due to: 1. <u>Missing core parameters</u> : dissolved metals (copper, cadmium, and zinc) and total mercury. 2. <u>Insufficient seasonal representation</u> .		

TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Oak Creek headwaters - West Fork Oak Creek 7 miles AZ15060202-019 Unique Waters	A&Wc Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive Agl Inconclusive Agl Inconclusive Category 3 -- Inconclusive	On the Planning List due to 1. Former <u>turbidity</u> standard exceedances (2 of 8 samples). <u>Turbidity</u> and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed. 2. <u>Missing core parameters</u> : total fluoride, total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, arsenic, chromium, lead, manganese, and copper).		
Oak Creek At Slide Rock State Park 1 mile AZ15060202-018B Unique Water (Reach was renumbered since last assessment - previously 018A.)	A&Ww Inconclusive FC Inconclusive FBC Not attaining DWS Inconclusive Agl Inconclusive Agl Inconclusive Category 4A -- Not Attaining	On the Planning List for: 1. <u>TMDL follow-up monitoring</u> for <i>Escherichia coli</i> exceedances (269 of 3408). 2. <u>Missing core parameters</u> : total fluoride, total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, arsenic, chromium, lead, manganese, and copper).	OK	<i>Escherichia coli</i> TMDL was approved by EPA in 1999. Placed on the Planning List in 2002 for TMDL follow-up monitoring. Currently initiating monitoring in support of a Phase II TMDL. Slide Rock has had intermittent swimming closures due to high bacteria counts every summer during this 5-year assessment period (1998-2002). This may also be evidence of narrative standards violations.
Oak Creek Below Slide Rock State Park - Dry Creek 20 miles AZ15060202-018C Unique Water (Reach was split into coldwater and warmwater segments since the last assessment. No current data in 018A.)	A&Ww Attaining FC Attaining FBC Attaining DWS Attaining Agl Attaining Agl Attaining Category 1 -- Attaining All Uses		<u>Delist turbidity</u> . Reach is now attaining its uses based on the former standard. Designated uses changed from A&Wc to A&Ww because the reach is below 5000-foot elevation; therefore the former turbidity standard was raised from 10 to 50 NTU. New and older turbidity data do not exceed 50 NTU.	
Oak Creek Dry Creek - Spring Creek 10 miles AZ15060202-017 Unique Water	A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive Agl Inconclusive Agl Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 2 samples). <u>Remove turbidity</u> from the Planning List. Designated uses changed from A&Wc to A&Ww because the reach is below 5000-foot elevation, raising the former turbidity standard from 10 to 50 NTU. New and older data do not exceed the 50 NTU.	OK show us the data	
Oak Creek Spring Creek - Verde River 13 miles AZ15060202-016 Unique Water	A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive Agl Inconclusive Agl Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 2 samples). <u>Remove turbidity</u> from the Planning List. Designated uses changed from A&Wc to A&Ww because the reach is below 5000-foot elevation, raising the former turbidity standard from 10 to 50 NTU. New and older data do not exceed the 50 NTU.	OK show us the data	

TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Oak Creek, West Fork headwaters - Oak Creek 16 miles AZ15060202-020 Unique Water	A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Pine Creek headwaters - unnamed tributary at 34°21'51"/111°26'46 8 miles AZ15060203-049A (Reach was split into coldwater and warmwater segments since the last assessment.)	A&Wc Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgL Inconclusive AgL Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		
Pine Creek unnamed tributary at 34°21'51"/111°26'46 - East Verde River 12 miles AZ15060203-049B (Reach was split into coldwater and warmwater segments since the last assessment.)	A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgL Inconclusive AgL Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		
Pumphouse Wash headwaters - Oak Creek 8 miles AZ15060202-442	A&Ww Inconclusive FC Inconclusive FBC Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : total mercury and dissolved metals (copper, cadmium, and zinc).		
Roundtree Canyon Creek headwaters - Tangle Creek 11 miles AZ15060203-853 (previously listed as Roundtree Creek)	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Spring Creek Coffee Creek - Oak Creek 7 miles AZ15060202-022	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive AgL Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Sycamore Creek Cedar Creek - Verde River 6 miles AZ15060202-026	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive AgL Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample). Added in 2002 due to missing core parameter.		

TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Sycamore Creek headwaters - Verde River 13 miles AZ15060203-055	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Verde River Granite Creek - Hell Canyon 16 miles AZ15060202-052	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Verde River Hell Canyon - unnamed reach 15060202-065 6 miles AZ15060202-038	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Verde River unnamed reach 15060202-065 - Railroad Draw 11 miles AZ15060202-037	A&Ww Attaining FC Attaining FBC Attaining Agl Attaining Agl Attaining Category 1 -- Attaining All Uses	Remove turbidity from the Planning List. Current turbidity data indicate designated uses are being attained (3 exceedances in 17 samples).	OK	Turbidity TMDL approved by EPA in 2002. Added to the Planning List in 2002 for TMDL follow-up monitoring.
Verde River Sycamore Creek - Oak Creek 25 miles AZ15060202-025	A&Ww Inconclusive FC Attaining FBC Inconclusive Agl Attaining Agl Attaining Category 2 -- Attaining Some Uses	On the Planning List due to: 1. Chronic mercury exceedance (1 of 1 sampling event). 2. <i>Escherichia coli</i> exceedance (1 of 25 sampling events, occurred in 2000). Remove turbidity from the Planning List. Current turbidity data indicate designated uses are being attained (3 exceedances in 17 samples).	OK	Turbidity TMDL approved by EPA in 2002. Added to the Planning List in 2002 for TMDL follow-up monitoring
Verde River Oak Creek - Beaver Creek 13 miles AZ15060202-015	A&Ww Not attaining FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 4A -- Not attaining	On the Planning List due to: 1. Insufficient monitoring data to assess (only 2 monitoring events). 2. Turbidity TMDL follow-up monitoring. Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed.	OK	Turbidity TMDL approved by EPA in 2002. Added to the Planning List in 2002 for TMDL follow-up monitoring.
Verde River Beaver Creek - HUC boundary 15060203 0.5 miles AZ15060202-001	A&Ww Not attaining FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 4A -- Not attaining	On the Planning List for: 1. Insufficient monitoring data (no current monitoring data). 2. Added in 2002 for turbidity TMDL follow-up monitoring. Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed.	OK	Turbidity TMDL approved by EPA in 2002. Added to the Planning List in 2002 for TMDL follow-up monitoring.

TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Verde River HUC boundary 15060203 - West Clear Creek 6 miles AZ15060203-027	A&Ww Inconclusive FC Attaining FBC Inconclusive AgI Attaining AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to: 1. <u>Escherichia coli</u> exceedance in 1 of 5 sampling events. Exceedance occurred in 1998, do not have 3 years of sampling after. 2. <u>Missing core parameters</u> : dissolved metals (copper, cadmium, and zinc).	OK	Turbidity TMDL approved by EPA in 2002. Not added to the Planning List in 2002 because turbidity was attaining uses (no exceedances in 6 samples).
Verde River West Clear Creek - Fossil Creek 24 miles AZ15060203-025	A&Ww Not attaining FC Attaining FBC Attaining AgI Attaining AgL Attaining Category 4A -- Not attaining	On the Planning List for: 1. TMDL follow-up monitoring for <u>turbidity</u> exceedances (6 of 17 samples). Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed. 2. <u>Chronic selenium</u> exceedance (1 of 1 sampling event).	OK	Turbidity TMDL for adjacent reaches (AZ15060202-037 through AZ15060202-027) approved by EPA in 2002. Turbidity loadings for this reach are expected to be addressed through implementation of the TMDL. Therefore, assessed as "not attaining" and added to the Planning List for TMDL follow-up monitoring.
Verde River Tangle Creek - Ister Flat 4 miles AZ15060203-018	A&Ww Not attaining FC Attaining FBC Inconclusive AgI Attaining AgL Attaining Category 4D -- Not attaining	On the Planning List due to: 1. Former <u>turbidity</u> standard exceedances (5 of 24 samples). Turbidity and suspended sediment concentration (SSC) monitoring will be scheduled during the next monitoring cycle for this watershed. 2. <u>Escherichia coli</u> exceedance (in 2000).	Turb/SSC	To be consistent with other assessments, this reach is assessed as "not attaining" and added to the Planning List due to <u>turbidity</u> for the following reasons: 1. Based on 5 of 24 samples exceeding the former turbidity standard (repealed in 2002), this reach is impaired by turbidity. 2. There is insufficient monitoring information to assess this stream based on suspended sediment concentration. 3. Reaches on the 303(d) List due to turbidity impairment are being placed in Category 4D (not attaining) until sufficient turbidity or suspended sediment concentration (new sediment standard) data are collected to make an assessment of "attaining" or "impaired." EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Verde River Horseshoe Dam - Alder Creek 11 miles AZ15060203-008	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgI Inconclusive AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : <u>Escherichia coli</u> , total boron, dissolved metals (copper, cadmium, and zinc), and total mercury.		
Verde River Bartlett Dam - Camp Creek 7 miles AZ15060203-004	A&Ww Inconclusive FC Attaining FBC Attaining DWS Attaining AgI Attaining AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>chronic selenium</u> exceedances in 4 of 23 sampling events (17% exceed).	add Se	

TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Verde River Camp Creek - Sycamore Creek 12 miles AZ15060203-003	A&Ww Inconclusive FC Inconclusive FBC Attaining DWS Inconclusive AgI Inconclusive AgL Inconclusive Category 2 — Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : dissolved cadmium and total metals (mercury, arsenic, chromium, lead, manganese, and copper).		
Verde River Sycamore Creek - Salt River 7 miles AZ15060203-001	A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgI Inconclusive AgL Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring events for core parameters (although 3 sampling events, there were only one or two samples for each of the core parameters).		
Webber Creek headwaters - East Verde River 14 miles AZ15060203-058	A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		
West Clear Creek Meadow Canyon - Verde River 65 miles AZ15060203-026B (Reach was split into coldwater and warmwater segments since the last assessment. No current data in 026A.)	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgI Inconclusive AgL Inconclusive Category 3 — Inconclusive	On the Planning List due to <u>missing core parameters</u> : total boron, <i>Escherichia coli</i> , dissolved zinc, and total metals (mercury, manganese, copper, and lead).		
Wet Beaver Creek Long Canyon - Rarick Canyon 7 miles AZ15060202-004	A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgI Inconclusive AgL Inconclusive Category 3 — Inconclusive	On the Planning List due to <u>missing core parameters</u> : total boron, <i>Escherichia coli</i> , dissolved metals (copper and zinc), and total metals (mercury, manganese, copper, and lead).		
Wet Beaver Creek Rarick Canyon - Dry Beaver Creek 7 miles AZ15060202-003	A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgI Inconclusive AgL Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Wet Bottom Creek headwaters - Verde River 20 miles AZ15060203-020	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Category 3 — Inconclusive (not assessed)	On the Planning List. No current monitoring data. Added in 2002 due to insufficient monitoring data.		

TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
VERDE WATERSHED — LAKE ASSESSMENTS				
Bartlett Lake 2375 acres AZL15060203-0110	A&Ww Inconclusive FC Attaining FBC Inconclusive DWS Attaining Agl Attaining Agl Attaining Category 2 — Attaining Some Uses Trophic status — Mesotrophic - Hypereutrophic	On the Planning List due to missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper, cadmium, and zinc).		
Fountain Lake 25 acres AZL15060203-0003	A&Ww Inconclusive FBC Inconclusive FC Inconclusive Category 3 — Inconclusive (not assessed) Trophic status not calculated	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Granite Basin Lake 7 acres AZL15060202-0580	A&Ww Impaired FC Attaining FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 5 — Impaired Trophic status — Eutrophic	On the Planning List due to: 1. High pH (3 of 9 samples). 2. Chronic ammonia exceedance (1 of 6 sampling events). 3. Missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper, cadmium, and zinc).	EPA placed this lake on the 2002 303(d) List for low dissolved oxygen. EPA's listing was based on 3 exceedances in 7 samples. Arizona's Impaired Waters Identification Rule requires a minimum of 20 samples to base a listing decision for dissolved oxygen. However, once listed the lake cannot be delisted until a TMDL is complete or dissolved oxygen data indicate designated uses are being attained. Current data show low dissolved oxygen in 3 of 9 samples.	add pH & DO
Green Valley Lake 13 acres AZL15060203-0015	A&Ww Inconclusive FC Inconclusive PBC Inconclusive Category 3 — Inconclusive (not assessed) Trophic status not calculated	On the Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		
Horseshoe Reservoir 2000 acres AZL15060203-0620	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 3 — Inconclusive Trophic status not calculated	On the Planning List due to: 1. Former turbidity standard exceedances (4 of 18 samples). Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed. 2. Missing core parameters: total boron, <i>Escherichia coli</i> , dissolved metals (copper, cadmium, and zinc), and total metals (mercury, manganese, copper, and lead).	Turb/SSC	
J.D. Dam Lake 29 acres AZL15060202-0700	A&Wc Inconclusive FC Attaining FBC Inconclusive Agl Attaining Agl Attaining Category 2 — Attaining Some Uses Trophic status — Eutrophic	On the Planning List due to: 1. Low pH (1 of 5 samples). 2. Missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper and cadmium).		

TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Pecks Lake 95 acres AZL15060202-1060	A&Wc Not attaining FC Attaining FBC Inconclusive AgI Attaining AgL Attaining Category 4A — Not attaining Trophic status — Eutrophic	On the Planning List due to: 1. TMDL follow-up monitoring for low <u>dissolved oxygen</u> (2 of 7 samples). 2. <u>Missing core parameters</u> : <i>Escherichia coli</i> , turbidity, and dissolved metals (cadmium, copper, and zinc).	OK	Nutrient TMDL to address <u>high pH</u> and low <u>dissolved oxygen</u> problems was approved by EPA in 2000. Placed on the Planning List in 2002 for TMDL follow-up monitoring.
Perkins Tank 4 acres AZL15060202-1080	A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 - Inconclusive (not assessed) Trophic status not calculated	On the Planning List due to: 1. Insufficient monitoring data to assess (only 2 samples). 2. Low <u>dissolved oxygen</u> (2 of 2 samples). 3. Former <u>turbidity</u> standard exceedance (1 of 1 sample). Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed.		
Scholze Lake 22 acres AZL15060202-1350	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 — Inconclusive Trophic status not calculated	On the Planning List due to: 1. Low <u>dissolved oxygen</u> (1 of 3 samples). 2. <u>Chronic lead</u> exceedance (1 of 1 sampling event). 3. Total <u>nitrogen</u> exceedance (2 of 4 samples). 4. Former <u>turbidity</u> standard exceedance (1 of 3 samples). Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed. 5. <u>Missing core parameters</u> : <i>Escherichia coli</i> , dissolved metals (copper and cadmium), and total metals (mercury, copper, and lead).		
Stehr Lake 20 acres AZL15060203-1480	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 — Inconclusive (not assessed) Trophic status — Mesotrophic	On the Planning List (no current monitoring data). Added in 2002 due to missing core parameter.		
Stoneman Lake 125 acres AZL15060202-1490	A&Wc Not attaining FC Attaining FBC Not attaining AgI Not attaining AgL Not attaining Category 4A — Not Attaining Trophic status — Mesotrophic	On the Planning List for: 1. TMDL follow up monitoring for <u>high pH</u> (6 of 10 samples). 2. <u>Arsenic</u> exceedance (2 of 8 samples). 4. <u>Missing core parameter</u> : <i>Escherichia coli</i> .	OK	Nutrient TMDL to address low <u>dissolved oxygen</u> and <u>high pH</u> was approved by EPA in 2000. Placed on the Planning List in 2002 for TMDL follow-up monitoring. Note that the lake has been totally or near dry for the last two years due to drought conditions.
Sullivan Lake 1 acres AZL15060202-3370	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgI Inconclusive AgL Inconclusive Category 3 — Inconclusive (not assessed) Trophic status not calculated	On the Planning List (no current monitoring data). Added in 2002 due to <u>high pH</u> (1 of 3 samples) and missing core parameters.		

TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Watson Lake 152 acres AZL15060202-1590	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 3 — Inconclusive Trophic status — Eutrophic	On the Planning List due to: 1. Low dissolved oxygen (1 of 5 samples). 2. High pH (2 of 5 samples). 3. Total nitrogen exceedance (2 of 5 samples). 4. Fish kill in 2000. 5. Missing core parameters: total boron, <i>Escherichia coli</i> , turbidity, dissolved metals (copper and cadmium), and total metals (mercury, copper, lead, and zinc).		Fish kill in 2000 associated with a blue-green algae and high pH (9.5 - 9.8). This algae can produce a toxin that can kill fish and is associated with lakes with high pH and elevated nutrients. This fish kill may be evidence of a narrative nutrient standard violation.
Whitehorse Lake 41 acres AZL15060202-1630	A&Wc Impaired FC Inconclusive FBC Inconclusive DWS Attaining Agl Attaining Agl Attaining Category 5 — Impaired Trophic status — Eutrophic	On the Planning List due to: 1. Chronic ammonia exceedance in 2 of 13 samples events (15% exceed). 2. Former turbidity standard exceedances (9 of 9 samples). Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed. 3. Fish kill in 1999. 4. Missing core parameters: <i>Escherichia coli</i> , dissolved metals (copper, cadmium, and zinc).	EPA placed this lake on the 2002 303(d) List for low dissolved oxygen based on 5 of 11 exceedances. Arizona's Impaired Waters Identification Rule requires a minimum of 20 samples to base a listing decision for dissolved oxygen. However, once listed the lake cannot be delisted until a TMDL is complete or dissolved oxygen data indicate designated uses are being attained. Current data show low dissolved oxygen in 4 of 14 samples. add NH ₃ & DO 29/9 TURB/SSC	Fish kill in 1999 related to algal bloom and low dissolved oxygen which may be evidence of a narrative standard violation. To be consistent with other assessments, this lake should be included as a Category 4D water (not attaining) and added to the Planning List for the following reasons: 1. Arizona is assessing all waters that are "impaired" under the former turbidity standard (repealed in 2002) "not attaining" until sufficient turbidity or suspended sediment concentration (new sediment standard) data are collected to make an assessment of "attaining" or "impaired." 2. For the 2002 303(d) List, EPA determined that 5 or more exceedances with less than 20 samples were sufficient to list a water as "impaired", although Arizona's Impaired Waters Identification Rule would require a minimum of 20 samples. 3. Turbidity exceeded standards in 9 of 9 samples. EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.

V. 2004 303(d) List, Assessment Categories, and TMDL Schedule

While Chapter IV provides a comprehensive look at Arizona's water quality assessment, it is primarily useful for looking up information on specific waters. So how does Arizona summarize its water quality findings? It would take a good deal of time, for example, to find out from Chapter IV just how many waters are assessed as "impaired," or to find just those waters that are assessed as "attaining all uses." This chapter provides a summary of the state's water quality assessment to the public and to EPA, beginning with a map of the state's "impaired" and "not attaining" waters.

Location of "Impaired" and "Not Attaining" Waters – On page V-3, Map 14 shows the location of "impaired" and "not attaining" waters in Arizona. Knowing the location of these waters is important. These lakes and stream reaches have been identified by ADEQ as those with the most severe water quality problems. Permit requirements for discharge to these waters will be much more strict, and permits may take more time to obtain. ADEQ must be sure that any new discharges, or discharge modifications, will not degrade water quality any further. These waters will also receive priority for funding of water quality improvement projects. Note that this map illustrates those waters identified by the state as impaired or not attaining. EPA has the authority to add (or remove) waters from these lists upon submittal (see explanation in Chapter IV, EPA's Additions to the 303(d) List). The final, EPA-approved lists and map will be posted on ADEQ's website when they are completed (www.adeq.state.az.us).

The Five Category Assessment List – Surface waters assessed in 2004 are organized by Category in Tables 26 through 30.

- | | |
|-------------------|---|
| Category 1 | Surface waters assessed as "attaining all uses." All designated uses are assessed as "attaining." |
| Category 2 | Surface waters assessed as "attaining some uses." Each designated use is assessed as either "attaining," "inconclusive," or "threatened." |
| Category 3 | Surface waters assessed as "inconclusive." All designated uses are assessed as "inconclusive" due to insufficient data to assess any designated use (e.g., insufficient samples or core parameters). By default, this category would include waters that were "not assessed" for similar reasons. (See note below.) |

- | | |
|-------------------|---|
| Category 4 | Surface waters assessed as "not attaining." At least one designated use was assessed as "not attaining" and no uses were assessed as "impaired." A Total Maximum Daily Load (TMDL) analysis will not be required at this time for one of the following reasons: |
| 4 A. | A TMDL has already been completed and approved by EPA but the water quality standards are not yet attained; |
| 4 B. | Other pollution control requirements are reasonably expected to result in the attainment of water quality standards by the next regularly scheduled listing cycle; or |
| 4 C. | The impairment is <u>not</u> related to a "pollutant" loading but rather due to "pollution" (e.g., hydrologic modification). |
| 4 D. | The surface water would be impaired under the former turbidity standard (repealed in 2002). |
| Category 5 | Surface waters assessed as "impaired." At least one designated use was assessed as "impaired" by a pollutant. These waters must be prioritized for TMDL development (Table 32). |

Category 5 - 303(d) List

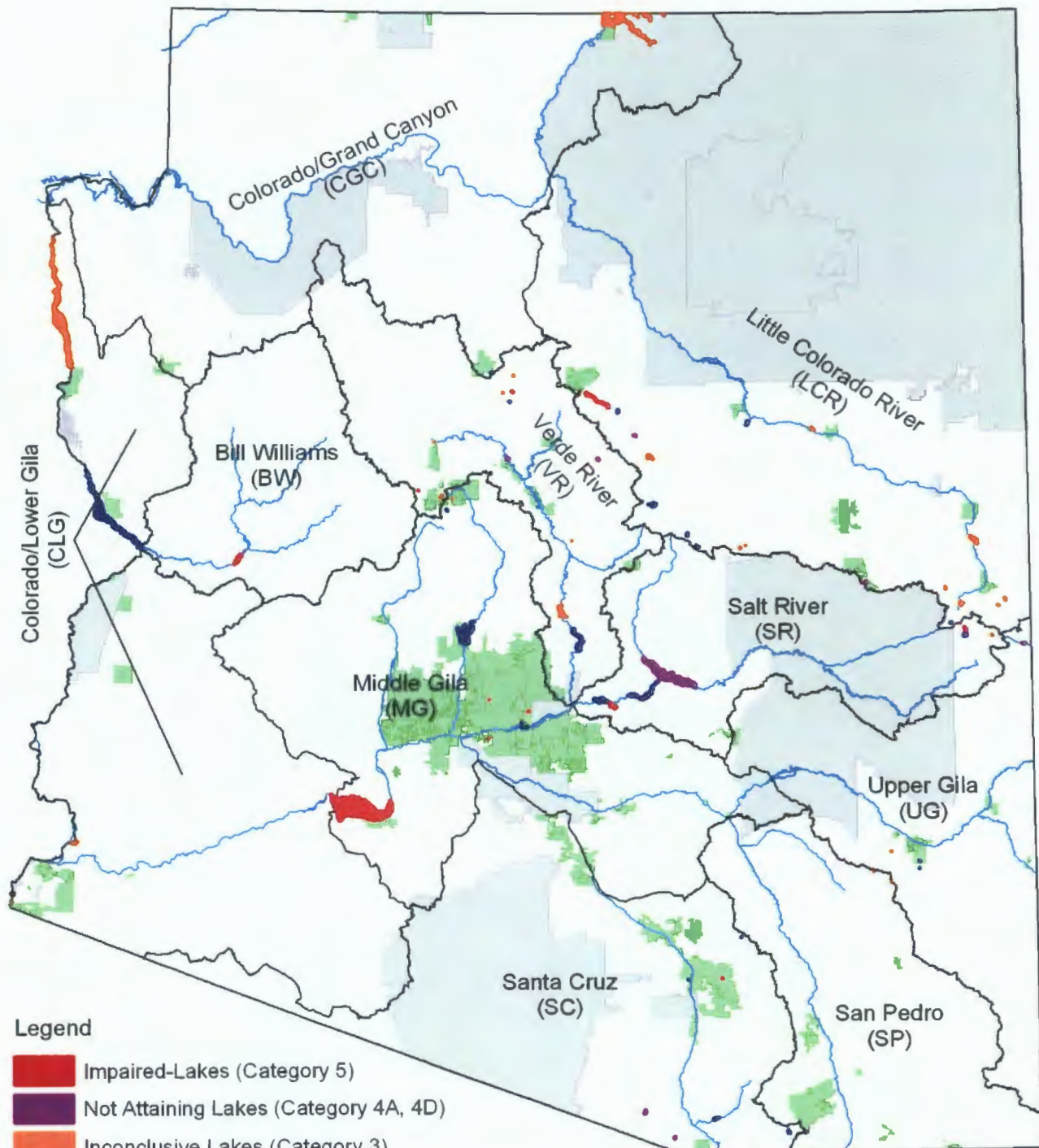
The 303(d) List identifies, by surface water segment, the pollutants or surface water characteristics not meeting surface water quality standards. The 303(d) List is a list of all impaired waters that require more than existing technology and permit controls to achieve or maintain surface water quality standards. EPA must approve this list and has the authority to add or remove surface waters from the list based on the federal Clean Water Act, regulations, or policies.

The objective is to systematically identify impaired surface waters and the pollutant(s) causing the impairment and ultimately establish a scientifically-based strategy (a TMDL) for restoring the surface water quality.

The status of TMDLs in progress or completed are highlighted in Chapter VIII. TMDL investigations have been initiated or completed on many of the surface waters on the 2002 303(d) List.

The five part list assists the state in identifying monitoring needs. For example, Category 1 waters will be monitored as part of the rotating watershed cycle as resources allow; while Category 2, 3, and 4 waters are placed on the Planning List and targeted for further monitoring over the next two watershed cycles. Category 5 waters are placed on the 303(d) List and scheduled for monitoring to support development of a TMDL; however, most of them also have water quality concerns that will also require targeted monitoring, so they are also on the Planning List. Surface waters can move from one category to another. The objective is to eventually have all surface waters attaining uses.

Note that many surface waters in Arizona could not be assessed because no water quality data or information has been collected during the monitoring period covered by this assessment. By default, all of these waters would be included in Category 3. These waters are not specifically named in this report, except for those placed on the Planning List in 2002. Once placed on the Planning List, these waters remain on the Planning List and appear in Category 3 until sufficient data are collected to make a complete assessment of all uses. Most surface waters lacking monitoring data are ephemeral or only flow for a short time, making it difficult to collect sufficient water quality data. As discussed in Chapter VIII, ADEQ's Ambient Monitoring Program is attempting to monitor and assess all perennial waters.



Statewide Assessment Map for Lakes

Note: See Watershed Assessment Maps
for the names and locations of each
lake assessed in detail.

Figure 26. 2004 Assessments of Lakes

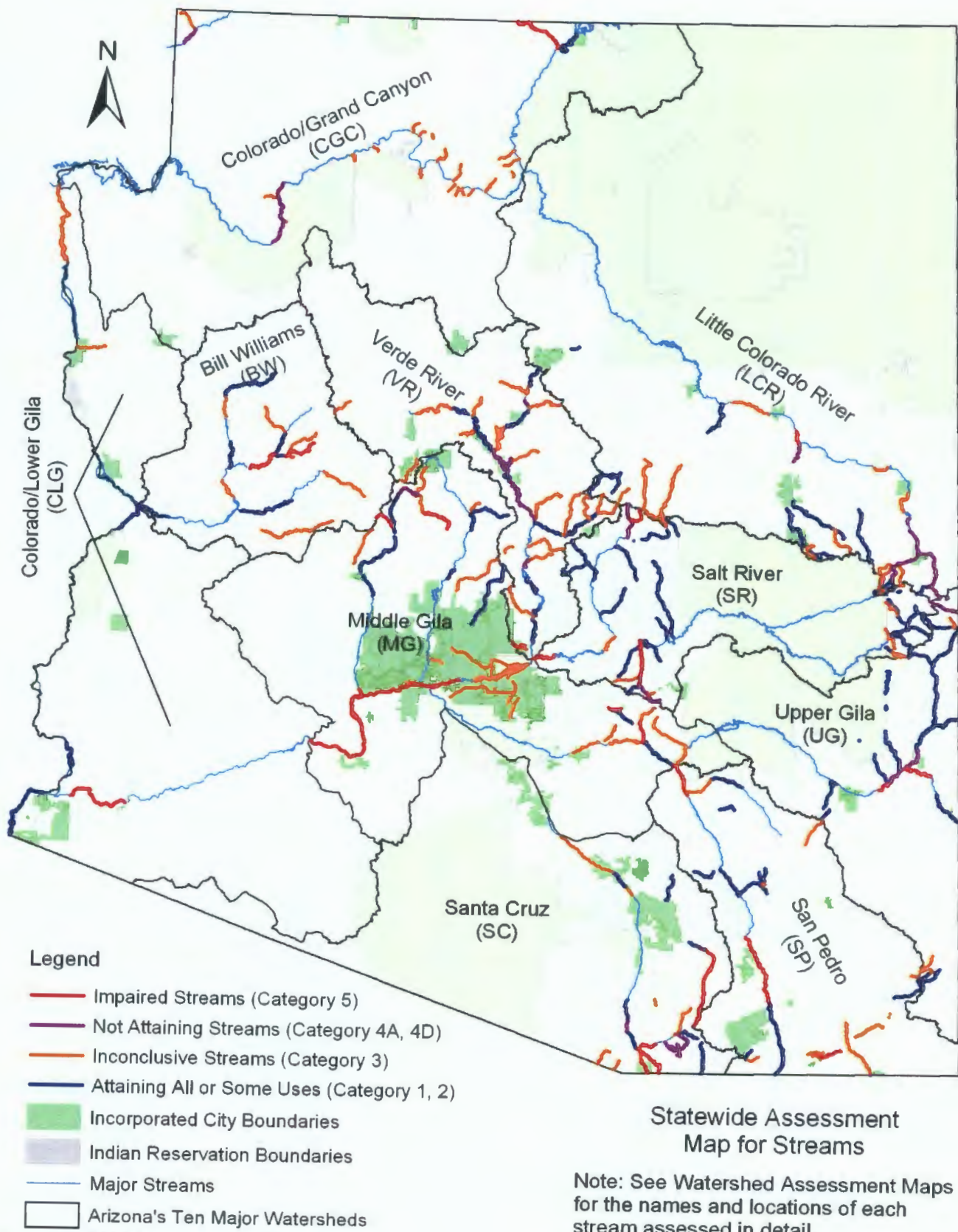


Figure 25. 2004 Assessments of Streams

Hg

- Alamo 2002

- Upper & Lower Mang 2002

- Soldier's & Soldier's Annex

- Long Lake 2003

- Lyman Lake ? 2003

- Parker Canyon Lake ? 2003

Assessment Categories and Planning List

Table 25. Category 5 – Impaired Waters Requiring a TMDL

At Least One Designated Use Assessed as "Impaired"
2004 303(d) List Submitted to EPA April 2004

☐ need to doublecheck our
2002 address. to be sure they
are here or good cause

☐
☐

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Bill Williams Watershed			
Alamo Lake	AZL15030204-0040	Yes: Missing core parameters	Yes: Mercury in fish tissue (EPA*), pH (high) ✓
Boulder Creek unnamed wash at 34°41'14"/113°18'00" - Wilder Creek	AZ15030202-006B	Yes: Copper, missing core parameters	Yes: Adding mercury ✓
Boulder Creek Wilder Creek - Copper Creek	AZ15030202-005A	Yes: Selenium, missing core parameters	Yes: Arsenic, copper, zinc, adding mercury ✓
Burro Creek Boulder Creek - Black Canyon	AZ15030202-004	No	Yes: Adding mercury ✓
Colorado - Grand Canyon Watershed <i>Colorado River Peshant-Diamond Lake</i>			
Paria River Utah border - Colorado River	AZ14070007-123	Yes: <i>Escherichia coli</i> , lead, <i>suspended sediment concentration, turbidity (4D**)</i>	Yes: Adding selenium ✓ <i>add Se</i>
Colorado - Lower Gila Watershed			
Gila River Coyote Wash - Fortuna Wash	AZ15070201-003	No	Yes: Adding boron, adding selenium
Painted Rock Borrow Pit Lake	AZL15070201-1010	Yes: Ammonia, pH (high), missing core parameters	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*), dissolved oxygen
Little Colorado - San Juan Watershed <i>Bear Canyon Lake</i>			
Lake Mary (lower) <i>add Long Lake</i>	AZL15020015-0890	Yes: Insufficient water monitoring	Yes: Mercury in fish tissue (EPA*)
Lake Mary (upper) <i>Cyma Lake</i>	AZL15020015-0900	Yes: Turbidity, insufficient water monitoring	Yes: Mercury in fish tissue (EPA*)
Little Colorado River Silver Creek - Carr Wash <i>Gold Creek Wash Soldiers Lake</i>	AZ15020002-004	Yes: Lead, <i>turbidity/SSC (4D**)</i>	Yes: Adding <i>Escherichia coli</i> <i>add Pb 3/12</i>
Little Colorado River Porter Tank - McDonalds Wash	AZ15020008-017	Yes: Suspended sediment concentration, missing core parameters	Yes: Copper, silver
Middle Gila Watershed			
Alvord Park Lake	AZL15060106B-0050	Yes: <i>Escherichia coli</i> , missing core parameters	Yes: Adding ammonia
Chaparral Lake	AZL15060106B-0300	Yes: Missing core parameters	Yes: Adding dissolved oxygen, adding <i>Escherichia coli</i>

Lynx Lake

add Pb & Mn

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Cortez Park Lake	AZL15060106B-0410	Yes: Fish kill (1999), missing core parameters	Yes: Adding dissolved oxygen, adding pH (high) ✓
French Gulch headwaters - Hassayampa River	AZ15070103-239	Yes: Missing core parameters	Yes: Copper, zinc
Gila River Salt River - Agua Fria River	AZ15070101-015	No	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)
Gila River Agua Fria River - Waterman Wash	AZ15070101-014	Yes: Insufficient monitoring	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)
Gila River Waterman Wash - Hassayampa River	AZ15070101-010	Yes: Insufficient monitoring	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)
Gila River Hassayampa River - Centennial Wash	AZ15070101-009	Yes: Insufficient monitoring	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)
Gila River Centennial Wash - Gillespie Dam	AZ15070101-008	Yes: Turbidity/SSC (4D**)	Yes: DDT metabolites, toxaphene, and chlordane in fish tissue (EPA*), boron, adding selenium ✓
Gila River Gillespie Dam - Rainbow Wash	AZ15070101-007	Yes: Insufficient monitoring	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)
Gila River Rainbow Wash - Sand Tank	AZ15070101-005	Yes: Insufficient monitoring	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)
Gila River Sand Tank - Painted Rocks Reservoir	AZ15070101-001	Yes: Insufficient monitoring	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)
Hassayampa River Buckeye Canal - Gila River	AZ15070103-001B	Yes: Turbidity/SSC	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)
Mineral Creek Devils Canyon - Gila River	AZ15050100-012B	Yes: Turbidity/SSC (4D**), missing core parameters	Yes: Copper, adding selenium ✓
Painted Rocks Reservoir	AZL15070101-1020A	Yes: Insufficient monitoring	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)
Queen Creek headwaters - Superior Mine WWTP	AZ15050100-014A	Yes: Missing core parameters	Yes: Copper
Queen Creek Superior Mine WWTP - Potts Canyon	AZ15050100-014B	Yes: Selenium, missing core parameters	Yes: Adding copper ✓
Salt River 23 rd Ave WWTP - Gila River	AZ15060106B-001D	No	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)
Turkey Creek unnamed tributary at 34°19'28"/112° - Poland Creek	AZ15070102-036B	Yes: Arsenic, lead, missing core parameters <i>7/18</i>	Yes: Cadmium, copper, zinc <i>add As, Pb</i>
Salt River Watershed			
Canyon Lake	AZL15060106A-0250	Yes: Missing core parameters	Yes: Adding dissolved oxygen

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
<i>Agua Lake</i> Christopher Creek headwaters - Tonto Creek	AZ15060105-353	Yes: Turbidity/SSC (4D**)	Yes: Adding <i>Escherichia coli</i> ✓
Crescent Lake	AZL15060101-0420	Yes: Total nitrogen, fish kill (in 1998), missing core parameters	Yes: pH (high, EPA*)
Pinto Creek Ripper Spring - Roosevelt Lake	AZ15060103-018C	No	Yes: Adding selenium ✓
Salt River Saguaro Lake - Verde River	AZ15060106A-003	Yes: <i>Escherichia coli</i>	Yes: Adding dissolved oxygen ✓
San Pedro - Willcox Playa - Rio Yaqui Watershed			
Mule Gulch Lavender Pit - Bisbee WWTP	AZ15080301-090B	Yes: Lead, missing core parameters	Yes: Copper, pH (low, EPA*) ✓
Mule Gulch Bisbee WWTP - Highway 80 Bridge	AZ15080301-090C	Yes: Lead, missing core parameters	Yes: Copper, zinc, pH (low), adding cadmium ✓
San Pedro River Babocomari Creek - Dragoon Wash	AZ15050202-003	No	Yes: Adding <i>Escherichia coli</i> ✓
San Pedro River Dragoon Wash - Tres Alamos Wash	AZ15050202-002	Yes: Fecal coliform/ <i>Escherichia coli</i> , turbidity/SSC, missing core parameters	Yes: Nitrate
San Pedro River Aravaipa Creek - Gila River	AZ15050203-001	Yes: Mercury, selenium	Yes: Adding <i>Escherichia coli</i> ✓ <i>add Se</i>
<i>San Pedro Mex. border - Charleston Tunnel - draw - add Pb/Zn/Mn/Be/OD - add Cu (margin 1.2.13)</i> Santa Cruz - Rio Magdalena - Rio Sonoyta			
Cienega Creek headwaters - Interstate 10	AZ15050302-006A	No	Yes: Adding <i>Escherichia coli</i> ✓
Lakeside Lake	AZL15050302-0760	Yes: Ammonia, turbidity (4D**), missing core parameters	Yes: Adding dissolved oxygen ✓ <i>add Ni</i>
Nogales and East Nogales washes Mexico border - Potrero Creek	AZ15050301-011	Yes: Ammonia, copper, turbidity/SSC (4D**)	Yes: Chlorine, adding <i>Escherichia coli</i> ✓
Santa Cruz River Mexico border - Nogales WWTP	AZ15050301-010	No	Yes: <i>Escherichia coli</i>
Sonoita Creek 750 feet below WWTP - Santa Cruz River	AZ15050301-013C	Yes: Copper	Yes: Adding zinc ✓
<i>San Francisco River</i> Upper Gila Watershed			
<i>Cave Creek</i> Gila River Skully Creek - San Francisco River	AZ15040002-001	Yes: Dissolved oxygen, lead	Yes: Adding selenium <i>add Se (2/1)</i>
<i>Bonita Creek</i> Gila River Bonita Creek - Yuma Wash	AZ15040005-022	Yes: Lead, turbidity/SSC (4D**)	Yes: Adding <i>Escherichia coli</i> ✓ <i>add Pb</i>

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Verde Watershed			
Grande Wash headwaters - Ashbrook Wash	AZ15060203-991	Yes: Missing core parameters	Yes: Adding <i>Escherichia coli</i>
Granite Basin Lake	AZL15060202-0580	Yes: pH (high), ammonia, missing core parameters	Yes: Dissolved oxygen (EPA*) <i>add pH</i>
Whitehorse Lake	AZL15060202-1630	Yes: Ammonia, turbidity (4D**) , fish kill in 1999, missing core parameters	Yes: Dissolved oxygen (EPA*) <i>add NH₃</i>

* Indicates that EPA placed the pollutant or parameter on the 2002 303(d) List, rather than ADEQ.

** Indicates that the water is also a Category 4D for turbidity (impaired under the former turbidity standard).

East Verde River

Edison - American Gulch

American Gulch - Verde River

Granite CR

Verde River

Barlett Dam - Camp Creek

- add Se

- add B; AS

- add E. coli; In TO

- add Se

Table 26. Category 4 – Impaired Waters Not Requiring a TMDL (Not Attaining)

At Least One Designated Use Assessed as "Not Attaining"
All Waters are On the Planning List for Follow Up Monitoring

4A = A TMDL has been approved by EPA but designated uses are not yet "attaining."

4B = Other pollution control requirements are expected to result in the attainment of water quality standards by the next regularly scheduled listing cycle (2 years currently).

4C = The impairment is not related to a "pollutant" loading, but caused by pollution (e.g., hydrologic modifications).

4D = Surface water would be "impaired" based on the former turbidity standard (Arizona created category for the 2004 assessment).

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Bill Williams Watershed (no Category 4 waters)			
Colorado - Grand Canyon Watershed			
Colorado River Parashant - Diamond Creek	AZ15010002-003	Yes 4D: Turbidity/SSC Other: Selenium, missing core parameters	No
Virgin River Beaver Dam Wash - Big Bend Wash	AZ15010010-003	Yes 4D: Turbidity/SSC Other: Selenium, missing core parameters	No
Colorado - Lower Gila Watershed (no Category 4 waters)			
Little Colorado - San Juan Watershed			
Kinnikinnick Lake	AZL15020015-0730	Yes 4D: Turbidity Other: Selenium, missing core parameters	No
Little Colorado River West Fork of the Little Colorado River - Water Canyon Creek	AZ15020001-011	Yes 4A: Turbidity/SSC (TMDL approved for adjacent reaches in 2002)	No
Little Colorado River Water Canyon Creek - Nutrioso Creek	AZ15020001-010	Yes 4A: Turbidity/SSC (TMDL approved in 2002) Other: Insufficient monitoring	No
Little Colorado River Nutrioso Creek - Camero Wash	AZ15020001-009	Yes 4A: Turbidity/SSC (TMDL approved in 2002) Other: <i>Escherichia coli</i>	No
Little Colorado River unnamed reach (15020001-021) to Lyman Lake	AZ15020001-005	Yes 4A: Turbidity/SSC (TMDL approved for adjacent reaches in 2002) Other: <i>Escherichia coli</i>	No
Nutrioso Creek headwaters - Picnic Creek	AZ15020001-017	Yes 4A: Turbidity/SSC (TMDL approved in 2000)	No
Nutrioso Creek Picnic Creek - Little Colorado River	AZ15020001-015	Yes 4A: Turbidity/SSC (TMDL approved in 2000) Other: Insufficient monitoring	No
Rainbow Lake	AZL15020005-1170	Yes 4A: Nutrients and pH (TMDLs approved in 2000) Other: Missing core parameters	No
Silver Creek Seven Mile Draw - Little Colorado River	AZ15020005-001	Yes 4D: Turbidity/SSC Other: Insufficient monitoring	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Middle Gila Watershed			
Hassayampa River headwaters - Copper Creek	AZ15070103-007A	Yes 4A: Cadmium, copper, zinc, and pH (TMDLs approved in 2002) Other: Missing core parameters	No
Hassayampa River, <u>unnamed tributary of</u> (trib to reach - 007A) headwaters - Hassayampa River	AZ15070102-417	Yes 4A: Cadmium, copper, zinc, and pH (loadings addressed in the Hassayampa TMDL approved in 2002) Other: Missing core parameters, insufficient monitoring	No
Salt River Watershed			
Gibson Mine tributary headwaters - Pinto Creek	AZ15060103-887	Yes 4A: Copper (loading addressed in Pinto Creek copper TMDL approved in 2001) Other: pH (low), zinc, missing core parameters	No
Pinto Creek headwater - tributary at 33°19'27"/110°54'56"	AZ15060103-018A	Yes 4A: Copper (TMDL approved in 2001) Other: Insufficient monitoring	No
Pinto Creek tributary at 33°19'27"/110°54'56" - Ripper Spring	AZ15060103-018B	Yes 4A: Copper (TMDL approved in 2001) Other: Selenium, zinc, missing core parameters	No
Roosevelt Lake	AZL15060103-1250	Yes 4D: Turbidity (related to 2002 fire) Other: Missing core parameters	No
Tonto Creek headwaters - unnamed tributary at 34°18'10"/111°04'14"	AZ15060105-013A	Yes 4D: Turbidity/SSC Other: <i>Escherichia coli</i> , nitrogen (annual mean)	No
Tonto Creek unnamed tributary at 34°18'10"/111°04'14" - Haigler Creek	AZ15060105-013B	Yes 4D: Turbidity/SSC Other: <i>Escherichia coli</i> , nitrogen (annual mean)	No
San Pedro - Willcox Playa - Rio Yaqui Watershed (no Category 4 waters)			
Santa Cruz - Rio Magdalena - Rio Sonoyta			
Alum Gulch headwaters - 31°28'20"/110°43'51"	AZ15050301-561A	Yes 4A: Cadmium, copper, pH (low), zinc (TMDLs approved in 2003) Other: Missing core parameter	No
Alum Gulch 31°28'20"/110°43'51" - 31°29'17"/110°44'25"	AZ15050301-561B	Yes 4A: Cadmium, copper, pH (low), zinc (TMDLs approved in 2003) Other: Missing core parameters	No
Arivaca Lake	AZL15050304-0080	Yes 4A: Mercury in fish tissue (TMDL approved in 1999) Other: Dissolved oxygen, pH (high), selenium, fish kill in 1999, missing core parameters	No
Cox Gulch headwaters - 3R Canyon	AZ15050301-560	Yes 4A: Cadmium, copper, zinc, and pH (low) (loadings included in 3R Canyon TMDLs approved in 2003) Other: Missing core parameters	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Cox Gulch, <u>unnamed tributary of</u> headwaters - Cox Gulch	AZ15050301-877	Yes 4A: Cadmium, copper, zinc, and pH (low) (loadings included in 3R Canyon TMDLs approved in 2003) Other: Insufficient monitoring	No
Harshaw Creek headwaters - Sonoita Creek	AZ15050301-025	Yes 4A: Copper and pH (low) (TMDLs approved in 2003) Other: Missing core parameter	No
Harshaw Creek, <u>unnamed tributary of</u> (Endless Chain Mine tributary) headwaters - Harshaw Creek	AZ15050301-888	Yes 4A: Copper and pH (low) (loadings included in TMDLs for Harshaw Creek approved in 2003)	No
Humbolt Canyon headwaters - Alum Gulch	AZ15050301-340	Yes 4A: Cadmium, copper, zinc, and pH (low) (TMDLs for Alum Gulch approved in 2003) Other: Missing core parameters	No
Pena Blanca Lake	AZL15050301-1070	Yes 4A: Mercury in fish tissue (TMDL approved in 1999) Other: pH (low), selenium, turbidity, missing core parameters	No
Santa Cruz River Josephine Canyon - Tubac Bridge	AZ15050301-008A	Yes 4D: Turbidity/SSC Other: Chlorine, missing core parameters	No
Three R Canyon headwaters - 31°28'35"/110°46'19"	AZ15050301-558A	Yes 4A: Cadmium, copper, zinc, and pH (low) (TMDLs approved in 2003) Other: Insufficient monitoring	No
Three R Canyon 31°28'35"/110°46'19"-31°28'27"/110°47'12"	AZ15050301-558B	Yes 4A: Cadmium, copper, zinc, and pH (low) (TMDLs approved in 2003) Other: Missing core parameters	No
Three R Canyon 31°28'27"/110°47'12" - Sonoita Creek	AZ15050301-558C	Yes 4A: Copper and pH (low) (TMDLs approved in 2003) Other: Missing core parameter	No
Three R Canyon, <u>unnamed tributary of</u> headwaters - Three R Canyon	AZ15050301-889	Yes 4A: Cadmium, copper, zinc, and pH (low) (loadings for this tributary included in the TMDLs for 3R Canyon approved in 2003) Other: Insufficient monitoring	No
Upper Gila Watershed			
Gila River San Francisco River - Eagle Creek	AZ15040005-024	Yes 4D: Turbidity/SSC Other: Insufficient monitoring	No
Gila River Eagle Creek - Bonita Creek	AZ15040005-023	Yes 4D: Turbidity/SSC Other: Insufficient monitoring	No
Luna Lake	AZL15040004-0840	Yes 4A: Dissolved oxygen, pH (high), and a fish kill in 1999 (Nutrient TMDL approved in 2000. TMDL addressed low dissolved oxygen, high pH, and fish kills) Other: Missing core parameters	No
San Francisco River headwaters - New Mexico border	AZ15040004-023	Yes 4D: Turbidity/SSC	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
San Francisco River Limestone Gulch - Gila River	AZ15040004-001	Yes 4D: Turbidity/SSC Other: Copper, <i>Escherichia coli</i>	No
Verde Watershed			
Beaver Creek Dry Beaver Creek - Verde River	AZ15060202-002	Yes 4D: Turbidity/SSC Other: Missing core parameters	No
Oak Creek At Slide Rock State Park	AZ15060202-018B	Yes 4A: <i>Escherichia coli</i> and swimming closures (TMDL approved in 1999) Other: Missing core parameters	No
Pecks Lake	AZL15060202-1060	Yes 4A: Dissolved oxygen (Nutrient TMDL approved in 2000 addressed low dissolved oxygen.) Other: Missing core parameters	No
Stoneman Lake	AZL15060202-1490	Yes 4A: pH (high), (Nutrient TMDL approved in 2000 addressed high pH.) Other: Arsenic, missing core parameters	No
Verde River Oak Creek - Beaver Creek	AZ15060202-015	Yes 4A: Turbidity/SSC (turbidity TMDL approved in 2002) Other: Insufficient monitoring	No
Verde River Beaver Creek - HUC boundary 15060203	AZ15060202-001	Yes 4A: Turbidity/SSC (turbidity TMDL approved in 2002) Other: Insufficient monitoring	No
Verde River West Clear Creek - Fossil Creek	AZ15060203-025	Yes 4A: Turbidity/SSC (turbidity TMDL approved in 2002 in adjacent reaches) Other: Selenium	No
Verde River Tangle Creek - Ister Flat	AZ15060203-018	Yes 4D: Turbidity/SSC Other: <i>Escherichia coli</i>	No

$3638154 =$
 121 TMDLs
 21 already done
 10 done in 2003
 $34/121 = 28\% \text{ done}$

Table 27. Category 3 -- Inconclusive Waters

All Designated Uses Assessed as "Inconclusive"
All Waters are On the Planning List for Follow Up Monitoring

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Bill Williams Watershed			
Big Sandy River Deluge Wash - Tule Wash	AZ15030201-011	Yes: Turbidity/SSC, missing core parameters	No
Big Sandy River Rupley Wash - Alamo Lake North	AZ15030201-001	Yes: Dissolved oxygen, missing core parameters	No
Butte Creek headwaters - Burro Creek	AZ15030202-163	Yes: Mercury, selenium, missing core parameters	No
Date Creek Cottonwood Creek - unnamed tributary (15030203-008)	AZ15030203-003	Yes: Insufficient monitoring	No
Francis Creek headwaters - Burro Creek	AZ15030202-012	Yes: Turbidity/SSC, insufficient monitoring	No
Kirkland Creek Skull Valley - Santa Maria River	AZ15030203-015	Yes: <i>Escherichia coli</i> , insufficient monitoring	No
Wilder Creek headwaters - Boulder Creek	AZ15030202-007	Yes: Missing core parameters	No
Colorado - Grand Canyon Watershed			
Beaver Dam Wash Utah border - Virgin River	AZ15010010-009	Yes: Insufficient monitoring	No
Boucher Creek California border - Colorado River	AZ15010002-017	Yes: Insufficient monitoring	No
Chuar (Lava) Creek headwaters - Colorado River	AZ15010001-024B	Yes: Insufficient monitoring	No
Clear Creek headwaters - Colorado River	AZ15010001-025B	Yes: Insufficient monitoring	No
Crystal Creek headwaters - Colorado River	AZ15010002-018B	Yes: Insufficient monitoring	No
Deer Creek headwaters - Colorado River	A15010002-019B	Yes: Insufficient monitoring	No
Garden Creek headwaters - Colorado River	AZ15010002-841	Yes: Insufficient monitoring	No
Havasu Creek Little Coyote Creek - Colorado River	AZ15010004-001	Yes: Turbidity/SSC, insufficient monitoring	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Hermit Creek headwaters - Colorado River	AZ15010002-020B	Yes: Insufficient monitoring	No
Kwagunt Creek headwaters - Colorado River	AZ15010001-031B	Yes: Insufficient monitoring	No
Lake Powell	AZL14070006-1130	Yes: <i>Escherichia coli</i> , missing core parameters	No
Monument Creek headwaters - Colorado River	AZ15010002-845	Yes: Insufficient monitoring	No
Nankoweap Creek headwaters - Colorado River	AZ15010001-033B	Yes: Insufficient monitoring	No
National Canyon Creek headwaters - Colorado River	AZ15010002-016	Yes: Insufficient monitoring	No
Royal Arch Creek headwaters - Colorado River	AZ15010002-871	Yes: Insufficient monitoring	No
Saddle Canyon Creek headwaters - Colorado River	AZ15010002-703B	Yes: Insufficient monitoring	No
Shinumo Creek headwaters - Colorado River	AZ15010002-029B	Yes: Insufficient monitoring	No
Spring Canyon Creek headwaters - Colorado River	AZ15010002-318	Yes: Insufficient monitoring	No
Tapeats Creek headwaters - Colorado River	AZ15010002-696	Yes: Insufficient monitoring	No
Three Springs Creek headwaters - Colorado River	AZ15010002-1180	Yes: Insufficient monitoring	No
Vasey's Paradise (Spring) at Colorado River	AZ15010001-SP01	Yes: Insufficient monitoring	No
Colorado - Lower Gila Watershed			
Colorado River Hoover Dam - Lake Mohave	AZ15030101-015	Yes: Selenium, missing core parameters	No
Colorado River, <u>unnamed tributary</u> (near Thumb Butte) headwaters - Colorado River	AZ15030101-560	Yes: Insufficient monitoring	No
Hunter's Hole (lake)	AZL15030108-0660	Yes: Selenium, insufficient monitoring	No
Lake Mohave	AZL15030101-0960	Yes: Insufficient monitoring	No
Mittry Lake	AZL15030107-0950	Yes: Insufficient monitoring	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Little Colorado - San Juan Watershed			
Black Canyon Lake	AZL15020008-0180	Yes: Fish kill related to fire (2002), insufficient monitoring	No
Brown Creek headwaters - Silver Creek	AZ15020005-016	Yes: Insufficient monitoring	No
Buck Springs Canyon headwaters - Leonard Canyon	AZ15020008-557	Yes: pH (low), turbidity/SSC, insufficient monitoring	No
Bunch Reservoir	AZL15020001-0230	Yes: Dissolved oxygen, missing core parameters	No
Carnero Lake	AZL15020001-0260	Yes: Dissolved oxygen, pH (high), missing core parameters	No
Chevelon Creek headwaters - West Chevelon Creek	AZ15020010-006	Yes: Dissolved oxygen, insufficient monitoring	No
Cholla Lake	AZL15020008-0320	Yes: Fish kill (2002), missing core parameters	No
Fish Creek headwaters - Little Colorado River	AZ15020001-211	Yes: Mercury, insufficient monitoring	No
Hall Creek headwaters - Little Colorado River	AZ15020001-012	Yes: Insufficient monitoring	No
Lee Valley Creek Lee Valley Reservoir - East Fork Little Colorado River	AZ15020001-232B	Yes: Insufficient monitoring	No
Little Colorado River HUC boundary 15020001 - unnamed trib. (15020002-025)	AZ15020002-024	Yes: Insufficient monitoring	No
Little Colorado River Zion Reservoir - Concho Creek	AZ15020002-004	Yes: Suspended sediment concentration, missing core parameters	No
Little Colorado River, South Fork headwaters - Little Colorado River	AZ15020001-027	Yes: Insufficient monitoring	No
Long Lake (lower)	AZL15020008-0820	Yes: Mercury in fish tissue, insufficient seasonal coverage, missing core parameters	No
Lyman Lake	AZL15020001-0850	Yes: Mercury in fish tissue, insufficient water monitoring	No
McKay Reservoir	AZL15020001-0007	Yes: Dissolved oxygen, pH (high), insufficient monitoring	No
Nelson Reservoir	AZL15020001-1000	Yes: Insufficient monitoring	No
Porter Creek headwaters - Show Low Creek	AZ15020005-246	Yes: Turbidity/SSC, insufficient monitoring	No
River Reservoir	AZL15020001-1220	Yes: Missing core parameters	No
Soldiers Annex Lake	AZL15020008-1430	Yes: Mercury in fish tissue, insufficient water monitoring	No
Soldiers Lake	AZL15020008-1440	Yes: Mercury in fish tissue, insufficient water monitoring	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Tunnel Reservoir	AZL15020001-1550	Yes: Dissolved oxygen, missing core parameters	No
Walnut Creek Pine Lake - Rainbow Lake	AZ15020005-238	Yes: Insufficient monitoring	No
Willow Creek headwaters - East Clear Creek	AZ15020008-011	Yes: Insufficient monitoring	No
Willow Spring Creek headwaters - Chevelon Creek	AZ15020010-240	Yes: Insufficient monitoring	No
Woods Canyon Creek headwaters - Chevelon Creek	AZ15020010-084	Yes: Dissolved oxygen, insufficient monitoring	No
Middle Gila Watershed			
Antelope Creek headwaters - Martinez Creek	AZ15070103-010	Yes: Insufficient monitoring	No
Arizona Canal Granite Reef Dam - Cholla WTP	AZ15060106B-099A	Yes: Missing core parameters	No
Arizona Canal Cholla WTP - HUC boundary 15070102	AZ15060106B-099B	Yes: Missing core parameters	No
Blue John Creek headwaters - unnamed tributary to Lynx Creek	AZ15070102-471	Yes: Cadmium, copper, zinc, insufficient monitoring	No
Buckeye Canal Gila River - South Extension Canal	AZ15070101-209	Yes: DDE (DDT pesticide metabolite), missing core parameters	No
Cash Mine Creek headwaters - Hassayampa River	AZ15070103-349	Yes: Copper, zinc, insufficient monitoring	No
Cash Mine Creek, <u>unnamed tributary of</u> headwaters - Cash Mine Creek	AZ15070103-415	Yes: Cadmium, copper, lead, zinc, insufficient monitoring	No
Consolidated Canal HUC boundary 15060106B - above WTP intake	AZ15050100-074A	Yes: Missing core parameters	No
Dripping Spring Wash headwaters - Gila River	AZ15050100-011	Yes: Insufficient monitoring	No
Eastern Canal WTP below Warner Road - terminus	AZ15050100-207B	Yes: Missing core parameters	No
Galena Gulch headwaters - Agua Fria River	AZ15070102-745	Yes: Cyanide, insufficient monitoring	No
Gila River Dripping Spring Wash - San Pedro River	AZ15050100-009	Yes: Insufficient monitoring	No
Gila River Mineral Creek - Donnelly Wash	AZ15050100-007	Yes: Copper, turbidity/SSC, insufficient monitoring	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Gila River Ashurst-Hayden Dam - Florence WWTP	AZ15050100-003B	Yes: Copper, insufficient monitoring	No
Grand Canal HUC boundary 15070101 - New River	AZ15070102-250	Yes: Missing core parameters	No
Indian Bend Wash headwaters - Salt River	AZ15060106B-179	Yes: Lead, missing core parameters	No
Little Ash Creek headwaters - Ash creek	AZ15070102-039	Yes: Insufficient monitoring	No
Lynx Creek headwaters - Agua Fria River	AZ15070102-033A	Yes: Cadmium, copper, insufficient monitoring	No
Lynx Creek, <u>unnamed tributary of</u> headwaters - Lynx Creek	AZ15070102-124	Yes: Cadmium, copper, zinc, insufficient monitoring	No
Martinez Canyon Creek headwaters - Box Canyon	AZ15050100-080	Yes: Insufficient monitoring	No
Mineral Creek headwaters - Devils Canyon	AZ15050100-012A	Yes: Insufficient monitoring	No
New River headwaters - Interstate 17	AZ15070102-006A	Yes: Insufficient monitoring	No
Salt River 2 km below Granite Reef Dam - Interstate 10 bridge	AZ15060106B-001B	Yes: Insufficient monitoring	No
South Canal Granite Reef Dam - Consolidated Canal	AZ15060106B-180	Yes: Missing core parameters	No
Tempe Canal HUC boundary 15050100 - Western Canal	AZ15050100-115	Yes: Missing core parameters	No
Turkey Creek headwaters - unnamed tributary at 34°19'28"/112°21'28"	AZ15070102-036A	Yes: Missing core parameters	No
Western Canal Tempe Canal - HUC boundary 15050100	AZ15060106B-262	Yes: Missing core parameters	No
Western Canal HUC boundary 15050100 - terminus	AZ15050100-990	Yes: Missing core parameters	No
Fain Lake	AZL15070101-0005	Yes: Turbidity, insufficient monitoring	No
Salt River Watershed			
Bear Wallow Creek, <u>North Fork</u> headwaters - Bear Wallow Creek	AZ15060101-022	Yes: Missing core parameters	No
Bear Wallow Creek, <u>South Fork</u> headwaters - Bear Wallow Creek	AZ15060101-258	Yes: Insufficient monitoring	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Bloody Tanks Wash Schultz Ranch - Miami Wash	AZ15060103-034B	Yes: Copper, insufficient monitoring	No
Cottonwood Canyon headwaters - Pinto Creek	AZ15060103-891	Yes: Insufficient monitoring	No
Gold Gulch Canyon headwaters - Pinto Creek	AZ15060103-894	Yes: Insufficient monitoring	No
Hay Creek headwaters - West Fork Black River	AZ15060101-353	Yes: Insufficient monitoring	No
Miller Springs Canyon headwaters - Pinto Creek	AZ15060103-892	Yes: Selenium, turbidity/SSC, missing core parameters	No
Pinto Creek, <u>West Fork</u> headwaters - Pinto Creek	AZ15060103-066	Yes: Insufficient monitoring	No
Reservation Creek headwaters - Black River	AZ15060101-010	Yes: Insufficient monitoring	No
Salt River Roosevelt Lake - Apache Lake	AZ15060106A-024	Yes: Insufficient monitoring	No
Snake Creek headwaters - Black River	AZ15060101-045	Yes: Missing core parameters	No
Stinky Creek Fort Apache Reservation - West Fork Black River	AZ15060101-352A	Yes: Missing core parameters	No
Lake Sierra Blanca	AZ15060101-1390	Yes: Fish kill (1998), insufficient monitoring	No
San Pedro - Willcox Playa - Rio Yaqui Watershed			
Aravaipa Canyon Creek Wilderness boundary - San Pedro River	AZ15050203-004C	Yes: Missing core parameters	No
Bass Canyon, <u>unnamed tributary of</u> headwaters - Bass Canyon Creek	AZ15050203-935	Yes: Insufficient monitoring	No
C Canyon headwaters - Mule Gulch	AZ15080301-342	Yes: Insufficient monitoring	No
Dubacher Canyon headwaters - Mule Gulch	AZ15080301-075	Yes: Insufficient monitoring	No
Grant Creek headwaters - High Creek	AZ15050201-033	Yes: Insufficient monitoring	No
Hendricks Gulch headwaters - Mule Gulch	AZ15080301-335	Yes: Insufficient monitoring	No
Leslie Canyon Creek headwaters - Whitewater Draw	AZ15080301-007	Yes: Insufficient monitoring	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Miller Canyon Creek headwaters - San Pedro River	AZ15050202-409A	Yes: Insufficient monitoring	No
Morales Creek headwaters - Mule Gulch	AZ15080301-331	Yes: Insufficient monitoring	No
Mule Gulch headwaters - Lavender Pit	AZ15080301-090A	Yes: Missing core parameters	No
Mural and Grassy Hill tributary headwaters - Mule Gulch	AZ15080301-334	Yes: Insufficient monitoring	No
OK and Youngblood tributary headwaters - Brewery Gulch	AZ15080301-xxx	Yes: Insufficient monitoring	No
Spring Canyon Creek headwaters - Mule Gulch	AZ15080301-333	Yes: Insufficient monitoring	No
Ward Canyon Creek headwaters - Turkey Creek	AZ15050201-433	Yes: Insufficient monitoring	No
Whitewater Draw Gadwell Canyon - unnamed tributary (15080301-003)	AZ15080301-004	Yes: Lead, insufficient monitoring	No
Whitewater unnamed tributary (15080301-003) - unnamed tributary at 31°20'36"/109°34'46"	AZ15080301-002A	Yes: Lead, zinc, insufficient monitoring	No
Winwood Canyon headwaters - Mule Gulch	AZ15080301-340	Yes: Insufficient monitoring	No
Riggs Flat Lake	AZL15050201-1210	Yes: Turbidity, insufficient monitoring	No
Snow Flat Lake	AZL15050201-1420	Yes: Insufficient monitoring	No
Twin Pond	AZL15080302-0001	Yes: Insufficient monitoring	No
Santa Cruz - Rio Magdalena - Rio Sonoyta			
Chimenea Creek headwaters - Rincon Creek	AZ15050302-140	Yes: Insufficient monitoring	No
Loma Verde Wash headwaters - unnamed tributary to Tanque Verde Wash	AZ15050302-268	Yes: Insufficient monitoring	No
Madera Canyon Creek headwaters - tributary at 31°43'42" / 110°52'50"	AZ15050301-322A	Yes: Insufficient monitoring	No
Madrona Creek headwaters - Rincon Creek	AZ15050302-138	Yes: Insufficient monitoring	No
Pena Blanca Canyon Creek Mexico border - Pena Blanca Lake	AZ15050301-808	Yes: Insufficient monitoring	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Potrero Creek Interstate 19 - Santa Cruz River	AZ15050301-500B	Yes: Chlorine, copper, missing core parameters	No
Santa Cruz River Roger Road WWTP outfall - Rillito Creek	AZ15050301-003B	Yes: Missing core parameters	No
Santa Cruz River HUC boundary 15050303 - Baumgartner Road	AZ15050303-005A	Yes: Missing core parameters	No
Sonoita Creek headwaters - Patagonia WWTP	AZ15050301-013A	Yes: Insufficient monitoring	No
Sycamore Creek headwaters - Mexico border	AZ15080200-002	Yes: Insufficient monitoring	No
Upper Gila Watershed			
Cave Creek, <u>North Fork</u> headwaters - Cave Creek	AZ15040006-856	Yes: Insufficient monitoring	No
East Turkey Creek headwaters - unnamed tributary at 31°58'22"/109°12'17"	AZ15040006-837A	Yes: Insufficient monitoring	No
Turkey Creek headwaters - Campbell Blue Creek	AZ15040004-060	Yes: Missing core parameters	No
Cluff Pond #3	AZL15040005-0370	Yes: Insufficient monitoring	No
Verde Watershed			
Apache Creek headwaters - Walnut Creek	AZ15060201-019	Yes: Insufficient monitoring	No
Bitter Creek Jerome WWTP - 2.5 miles below WWTP	AZ15060202-066B	Yes: Insufficient monitoring	No
Bitter Creek, <u>unnamed tributary of</u> headwaters - Bitter Creek	AZ15060202-868	Yes: Cadmium, copper, pH (low), zinc, insufficient monitoring	No
Camp Creek headwaters - Verde River	AZ15060203-031	Yes: Insufficient monitoring	No
Colony Wash headwaters - Verde River	AZ15060203-998	Yes: Insufficient monitoring	No
<u>East Verde River</u> headwaters - Ellison Creek	AZ15060203-022A	Yes: <u>Turbidity/SSC</u> , insufficient monitoring	No
Ellison Creek headwaters - East Verde River	AZ15060203-459	Yes: Insufficient monitoring	No
Fossil Creek headwaters - Verde River	AZ15060203-459	Yes: Insufficient monitoring	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Granite Creek headwaters - 15060202-060	AZ15060202-059A	Yes: <i>Escherichia coli</i> , dissolved oxygen, mercury, turbidity/SSC, missing core parameters	No <i>E. coli</i> = 1 max, 1 gpm-cdn DO = 4/6 Wg = 1/2
Munds Creek headwaters - Oak Creek	AZ15060202-415	Yes: Missing core parameters, insufficient seasonal coverage	No
Oak Creek headwaters - West Fork Oak Creek	AZ15060202-019	Yes: Turbidity/SSC, missing core parameters	No
Oak Creek Dry Creek - Spring Creek	AZ15060202-017	Yes: Insufficient monitoring	No
Oak Creek Spring Creek - Verde River	AZ15060202-016	Yes: Insufficient monitoring	No
Oak Creek, <u>West Fork</u>	AZ15060202-020	Yes: Insufficient monitoring	No
Pine Creek headwaters - unnamed tributary at 34°21'51"/111°26'46	AZ15060203-049A	Yes: Insufficient monitoring	No
Pine Creek unnamed tributary at 34°21'51"/111°26'46 - East Verde River	AZ15060203-049B	Yes: Insufficient monitoring	No
Roundtree Creek headwaters - Tangle Creek	AZ15060203-853	Yes: Insufficient monitoring	No
Spring Creek Coffee Creek - Oak Creek	AZ15060202-022	Yes: Insufficient monitoring	No
Sycamore Creek Tule Canyon - Cedar Creek	AZ15060202-026	Yes: Insufficient monitoring	No
Sycamore Creek headwaters - Verde River	AZ15060203-055	Yes: Insufficient monitoring	No
Verde River Granite Creek - Hall Creek	AZ15060202-052	Yes: Insufficient monitoring	No
Verde River Hell Canyon - unnamed reach number 15060202-065	AZ15060202-038	Yes: Insufficient monitoring	No
Webber Creek headwaters - East Verde River	AZ15060203-058	Yes: Insufficient monitoring	No
West Clear Creek Meadow Canyon - Verde River	AZ15060203-026B	Yes: Missing core parameters	No
Wet Beaver Creek Long Canyon - Rarick Canyon	AZ15060202-004	Yes: Missing core parameters	No
Wet Beaver Creek Rarick Canyon - Dry Beaver Creek	AZ15060202-003	Yes: Insufficient monitoring	No

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Wet Bottom Creek headwaters - Verde River	AZ15060203-020	Yes: Insufficient monitoring	No
Fountain Lake	AZL15060203-0003	Yes: Insufficient monitoring	No
Green Valley Lake	AZL15060203-0015	Yes: Insufficient monitoring	No
Horseshoe Reservoir	AZL15060203-0620	Yes: Turbidity, missing core parameters	No
Perkins Tank	AZL15060202-1080	Yes: Dissolved oxygen, turbidity, insufficient monitoring	
Scholze Lake	AZL15060202-1350	Yes: Dissolved oxygen, lead, nitrogen, turbidity, missing core parameters	No
Stehr Lake	AZL15060203-1480	Yes: Insufficient monitoring	No
Sullivan Lake	AZL15060202-3370	Yes: pH (high), insufficient monitoring	No
Watson Lake	AZL15060202-1590	Yes: Dissolved oxygen, pH (high), nitrogen, fish kill, missing core parameters	No

In 2000
 low DO = 1/5
 H₂ PH = 2/5
 Tot Nit = 2/5
 Fish KTL due to B/G algae bloom

Table 28. Category 2 -- Attaining Some Uses

At least One Designated Use Assessed as "Attaining" and All Others are "Inconclusive"
All Waters are On the Planning List for Follow Up Monitoring

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Bill Williams Watershed			
Big Sandy River Sycamore Creek - Burro Creek	AZ15030201-004	Yes: Selenium	No
Bill Williams River Point B - Colorado River	AZ15030204-001	Yes: Turbidity/SSC, missing core parameters	No
Boulder Creek Copper Creek - Burro Creek	AZ15030202-005B	Yes: Mercury, selenium, missing core parameters	No
Burro Creek Francis Creek - Boulder Creek	AZ15030202-008	Yes: Copper, mercury, missing core parameters	No
Santa Maria River Bridle Wash - Date Creek	AZ15030203-009	Yes: <i>Escherichia coli</i>	No
Colorado - Grand Canyon Watershed			
Colorado River Lake Powell - Paria River	AZ14070006-001	Yes: Missing core parameters	No
Dogtown Reservoir	AZL15010004-0480	Yes: Selenium, dissolved oxygen, pH (high), turbidity, missing core parameters	No
Colorado - Lower Gila Watershed			
Colorado River Indian Wash - Imperial Dam	AZ15030104-001	Yes: Suspended sediment concentration	No
Colorado River Main Canal - Mexico border	AZ15030107-001	Yes: Suspended sediment concentration	No
Lake Havasu	AZL15030101-0590A	Yes: Mercury, selenium, <i>Escherichia coli</i>	No
Little Colorado - San Juan Watershed			
Ashurst Lake	AZL15020015-0090	Yes: Turbidity, missing core parameters	No
Barbershop Canyon Creek headwaters - East Clear Creek	AZ15020008-537	Yes: Missing core parameter	No
Bear Canyon Lake	AZL15020008-0130	Yes: Dissolved oxygen, pH (low), selenium, missing core parameters	No
Billy Creek headwaters - Show Low Creek	AZ15020005-019	Yes: <i>Escherichia coli</i> , turbidity/SSC, missing core parameter	No

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Blue Ridge Reservoir	AZL15020008-0200	Yes: Dissolved oxygen, missing core parameters	No
Chevelon Creek Black Canyon - Little Colorado River	AZ15020010-001	Yes: Turbidity/SSC	No
Colter Creek headwaters - Nutrioso Creek	AZ15020001-293	Yes: Missing core parameter	No
Clear Creek Reservoir	AZL15020008-0340	Yes: Dissolved oxygen, missing core parameters	No
East Clear Creek headwaters - Yeager Canyon	AZ15020008-009	Yes: Dissolved oxygen, missing core parameter	No
Lee Valley Reservoir	AZL15020001-0770	Yes: Missing core parameters	No
Little Colorado River, <u>East Fork</u> headwaters - Hall Creek	AZ15020001-280	Yes: Missing core parameters	No
Little Colorado River, <u>West Fork</u> headwaters - Government Springs	AZ15020001-013A	Yes: Missing core parameters	No
Little Colorado River, <u>West Fork</u> Government Springs - Little Colorado River	AZ15020001-013B	Yes: Copper, missing core parameters	No
Mineral Creek headwaters - Concho Creek	AZ15020002-648	Yes: Dissolved oxygen, missing core parameter	
Rio de Flag Flagstaff WWTP - San Francisco Wash	AZ15020015-004B	Yes: Turbidity/SSC	No
Show Low Creek headwaters - Linden Wash	AZ15020005-012	Yes: Turbidity/SSC	No
Silver Creek headwaters - Show Low Creek	AZ15020005-013	Yes: Dissolved oxygen, turbidity/SSC, missing core parameter	No
Woods Canyon Lake	AZL15020010-1700	Yes: Missing core parameters	No
Middle Gila Watershed			
Gila River San Pedro River - Mineral Creek	AZ15050100-008	Yes: Turbidity/SSC	No
Hassayampa River Copper Creek - Blind Indian Creek	AZ15070103-007B	Yes: <i>Escherichia coli</i>	No
Hassayampa River Sols Wash - 8 miles below Wickenburg	AZ15070103-002A	Yes: <i>Escherichia coli</i>	No
Lake Pleasant	AZL15070102-1100	Yes: Ammonia, selenium, missing core parameter	No
Lynx Lake	AZL15070102-0860	Yes: Lead, manganese, missing core parameters	No
Papago Park Ponds	AZL15060106B-1030	Yes: Missing core parameters	No

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Salt River Watershed			
Apache Lake	AZL15060106A-0070	Yes: Dissolved oxygen, missing core parameters	No
Bear Wallow Creek headwaters - Black River	AZ15060101-023	Yes: Missing core parameters	No
Beaver Creek headwaters - Black River	AZ15060101-008	Yes: Turbidity/SSC, missing core parameter	No
Big Lake	AZL15060101-0160	Yes: Dissolved oxygen, missing core parameters	No
Black River Beaver Creek - Reservation Creek	AZ15060101-007	Yes: Missing core parameters	No
Black River, East Fork headwaters - Black River	AZ15060101-009	Yes: Missing core parameter	No
Black River, West Fork headwaters - Black River East Fork	AZ15060101-048	Yes: Missing core parameters	No
Canyon Creek headwaters - Oak Creek	AZ15060103-014	Yes: Fish kill due to fire (2002)	No
Fish Creek headwaters - Black River	AZ15060101-032	Yes: Copper, missing core parameters	No
Rye Creek headwaters - Tonto Creek	AZ15060105-014	Yes: Missing core parameter	No
Saguaro Lake	AZL15060106A-1290	Yes: Missing core parameters	No
Salt River Pinal Creek - Roosevelt Lake	AZ15060103-004	Yes: <i>Escherichia coli</i> , total nitrogen, suspended sediment concentration	No
Spring Creek headwaters - Tonto Creek	AZ15060105-010	Yes: Missing core parameter	No
San Pedro - Willcox Playa - Rio Yaqui Watershed			
Copper Creek headwaters - Prospect Canyon	AZ15050203-022A	Yes: Selenium	No
Double R Canyon Creek headwaters - Bass Canyon Creek	AZ15050203-902	Yes: Missing core parameter	No
Ramsey Canyon Creek headwaters - Forest Road 110	AZ15050202-404A	Yes: Missing core parameter	No
San Pedro River Mexico border - Charleston	AZ15050202-008	Yes: Copper, selenium, suspended sediment concentration	No
San Pedro River Charleston - Walnut Gulch	AZ15050202-006	Yes: Turbidity/SSC	No

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
San Pedro River Hot Springs Creek - Redfield Canyon	AZ15050203-011	Yes: <i>Escherichia coli</i> , turbidity/SSC	No
Whitewater Draw Unnamed trib. at 31°20'36"/109°34'46" - Mexico border	AZ15080301-002B	Yes: Lead, missing core parameters	No
Santa Cruz - Rio Magdalena - Rio Sonoyta			
Sabino Canyon Creek headwaters - Tanque Verde Wash	AZ15050302-014B	Yes: Missing core parameters	No
Santa Cruz River Nogales WWTP - Josephine Canyon	AZ15050301-009	Yes: Missing core parameters	No
Santa Cruz River Tubac Bridge - Soporl Wash	AZ15050301-008B	Yes: Missing core parameters	No
Santa Cruz River Canada del Oro - HUC boundary 15050303	AZ15050301-001	Yes: Chlorine	No
Kennedy Lake	AZL15050302-0720	Yes: Missing core parameters	No
Parker Canyon Lake	AZL15050301-1040	Yes: Missing core parameters, mercury in fish tissue (2002)	No
Patagonia Lake	AZL15050301-1050	Yes: Missing core parameters	No
Rose Canyon Lake	AZL15050302-1260	Yes: pH (low and high), turbidity, missing core parameters	No
Upper Gila Watershed			
Ash Creek unnamed tributary at 32°45'37"/109°52'22" - Gila River	AZ15040005-040B	Yes: Missing core parameters	No
Blue River New Mexico border - KP Creek	AZ15040004-026	Yes: Missing core parameters	No
Blue River KP Creek - Strayhorse Creek	AZ15040004-025A	Yes: Missing core parameters	No
Campbell Blue Creek headwaters - Blue River	AZ15040004-028	Yes: Missing core parameter	No
Cave Creek headwaters - South Fork of Cave Creek	AZ15040006-852A	Yes: Selenium	No
Cave Creek South Fork of Cave Creek - USFS boundary	AZ15040006-852B	Yes: Turbidity/SSC	No
Cave Creek, <u>South Fork</u> headwaters - Cave Creek	AZ15040006-849	Yes: <i>Escherichia coli</i>	No
Eagle Creek headwaters - unnamed tributary at 33°23'24"/109°29'35"	AZ15040005-028A	Yes: Missing core parameters	No

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Frye Canyon Creek headwaters - Frey Mesa Reservoir	AZ15040005-988A	Yes: Missing core parameters	No
Gila River New Mexico border - Bitter Creek	AZ15040002-004	Yes: Selenium	No
KP Creek headwaters - Blue River	AZ15040004-029	Yes: Missing core parameters	No
San Francisco River New Mexico border - Blue River	AZ15040004-004	Yes: Turbidity/SSC	No
San Francisco River Blue River - Limestone Gulch	AZ15040004-003	Yes: <i>Escherichia coli</i>	No
Dankworth Pond	AZL15040005-0440	Yes: Selenium, turbidity, missing core parameters	No
Roper Lake	AZL15040005-1250	Yes: Missing core parameter	No
Verde Watershed			
East Verde River Ellison Creek - American Gulch	AZ15060203-022B	Yes: Selenium	No
East Verde River American Gulch - Verde River	AZ15060203-022C	Yes: Boron	No
Pumphouse Wash headwaters - Oak Creek	AZ15060202-442	Yes: Missing core parameters	No
Verde River Sycamore Creek - Oak Creek	AZ15060202-025	Yes: Mercury, <i>Escherichia coli</i>	No
Verde River HUC boundary 15060203 - West Clear Creek	AZ15060203-027	Yes: <i>Escherichia coli</i> , missing core parameters	No
Verde River Horseshoe Dam - Alder Creek	AZ15060203-008	Yes: Missing core parameters	No
Verde River Bartlett Dam - Camp Creek	AZ15060203-004	Yes: Selenium	No
Verde River Camp Creek - Sycamore Creek	AZ15060203-004	Yes: Missing core parameters	No
Bartlett Lake	AZL15060203-0110	Yes: Missing core parameters	No
J.D. Dam Lake	AZ15060202-0700	Yes: pH (low), missing core parameters	No

Table 29. Category 1 -- Attaining All Uses

All Designated Uses are Assessed as "Attaining"

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Bill Williams Watershed			
Trout Creek Cow Creek - Knight Creek	AZ15030201-014	No	No
Colorado - Grand Canyon Watershed (no Category 1 waters)			
Colorado - Lower Gila Watershed			
Colorado River Bill Williams River - Osborne Wash	AZ15030104-020	No	No
Little Colorado - San Juan Watershed (no Category 1 waters)			
Middle Gila Watershed			
Agua Fria River Sycamore Creek - Big Bug Creek	AZ15070102-023	No	No
Agua Fria River Little Squaw Creek - Cottonwood Creek	AZ15070102-017	No	No
Arnett Creek headwaters - Queen Creek	AZ15050100-1818	No	No
Cave Creek headwaters - Cave Creek Dam	AZ15060106B-026A	No	No
Hassayampa River Cottonwood Creek - Martinez Wash	AZ15070103-004	No	No
Sycamore Creek Tank Canyon - Agua Fria River	AZ15070102-024B	No	No
Tempe Town Lake	AZL15060106B-1588	No	No
Salt River Watershed			
Campaign Creek headwaters - Pinto Creek	AZ15060103-037	No	No
Cherry Creek tributary at 35°05'09"/110°56'04" - Salt River	AZ15060103-015B	No	No
Coon Creek Unnamed tributary at 33°46'42"/110°54'25" - Salt River	AZ15060103-039B	No	No

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Deer Creek headwaters - Rye Creek	AZ15060105-018	No	No
Greenback Creek headwaters - Tonto Creek	AZ15060105-005	No	No
Haigler Creek headwaters - unnamed reach at 34°12'23.5"/111°00'11"	AZ15060105-012A	No	No
Haunted Canyon headwaters - Pinto Creek	AZ15060103-879	No	No
Pinal Creek Jesse Lane - Salt River	AZ15060103-280D	No	No
Tonto Creek Rye Creek - Gun Creek	AZ15060105-008	No	No
San Pedro - Willcox Playa - Rio Yaqui Watershed			
Aravaipa Canyon Creek Stowe Gulch - Wilderness boundary	AZ15050203-004B	No	No
Bass Canyon Creek tributary at 32°26'06"/110°13'18" - Hot Springs Canyon Creek	AZ15050203-899B	No	No
Buehman Canyon headwaters - end of Unique Waters	AZ15050203-010A	No	No
Hot Springs Canyon Creek headwaters - San Pedro River	AZ15050203-013	No	No
Rucker Canyon Creek headwaters - Whitewater Draw	AZ15080301-288	No	No
Santa Cruz - Rio Magdalena - Rio Sonoyta			
Cienega Creek Interstate 10 - Del Lago Dam	AZ15050302-006B	No	No
Redrock Canyon Creek headwaters - Harshaw Creek	AZ15050301-576	No	No
Santa Cruz River headwaters - Mexico border	AZ15050301-268	No	No
Upper Gila Watershed			
Blue River Strayhorse Creek - Gila River	AZ15040004-025B	No	No
Bonita Creek Park Creek - Gila River	AZ15040005-030	No	No

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern	On the 2004 303(d) List Pollutants or Parameters of Concern
Eagle Creek Willow Creek - Sheep Wash	AZ15040005-027	No	No
Eagle Creek Sheep Wash - Gila River	AZ15040005-025	No	No
Verde Watershed			
Oak Creek Below Slide Rock State Park - Dry Creek	AZ15060202-018C	No	No
Verde River Unnamed reach 15060202-065 - Railroad Draw	AZ15060202-037	No	No

What is Arizona Proposing to delist from the 2002 303(d) List?

The parameters of concern being removed from the 2002 303(d) List and the reason for their removal were detailed in the assessment tables in Chapter IV. The following list provides a summary of all of the delisted parameters and surface waters.

At least one of the following criteria for delisting a pollutant or reach is shown in **Table 30**, as established in the Impaired Waters Identification Rule (Appendix B) (R18-11-605.E.2 and R18-11-604.B):

Criteria Number

1. EPA-approved TMDL has been developed for the pollutant;
2. New data indicate that the water quality standard is being met;
3. Change in the standard or designated use, results in the water quality standard is no longer being exceeded;
4. Reevaluation of the assessment information indicates an error or deficiency in the original analysis resulted in an inappropriate listing;
5. Pollutant loadings from naturally occurring conditions alone are sufficient to cause a violation of the water quality standard;
6. Reach is split and no current or historic data exists in this portion of the reach that would support a listing.

Table 30. Pollutants and Surface Waters Removed From 2002 303(d) List

Surface Water	Reach or Lake Number	Pollutant or Parameter of Concern Removed From List	Criteria For Delist	Delist Surface Water
Bill Williams Watershed				
Boulder Creek unnamed wash at 34°41'14"/113°18'00" - Wilder Creek	AZ15030202-006B	Fluoride	3 - Change in standard.	No. Remains on list due to mercury.
Alamo Lake	AZL15030204-0040	Low dissolved oxygen	2 - Current data indicates uses are being attained.	No. Remains on list due to mercury in fish tissue and high pH.
		Sulfide	3 - Change in standard.	
Colorado - Grand Canyon Watershed				
Colorado River Parashant - Diamond Creek	AZ15010002-003	Turbidity	3 - Change in standard. (Moved to Category 4D).	Yes.
Virgin River Beaver Dam Wash - Big Bend Wash	AZ15010010-003	Fecal coliform	3 - Change in standard. <i>E. coli</i> standard is being attained.	Yes.
		Turbidity	3 - Change in standard. (Moved to Category 4D).	
Colorado - Lower Gila Watershed				
Painted Rock Borrow Pit Lake	AZ15070201-1010	Fecal coliform	3 - Change in standard. <i>E. coli</i> standard is being attained.	No. Remains on list due to fish consumption advisory (DDT metabolites, toxaphene and chlordane in fish), and low dissolved oxygen.

Surface Water	Reach or Lake Number	Pollutant or Parameter of Concern Removed From List	Criteria For Delist	Delist Surface Water
Little Colorado - San Juan Watershed				
Little Colorado River Water Canyon Creek - Nutrioso Creek	AZ15020001-010	Turbidity	1 - TMDL approved in 2002	Yes.
Little Colorado River Nutrioso Creek - Carnero Wash	AZ15020001-009	Turbidity	1 - TMDL approved in 2002	Yes.
Middle Gila Watershed				
French Gulch headwaters - Hassayampa River	AZ15070103-239	Manganese	3 - Change in standard. New manganese standard is not exceeded in the current or historic data.	No. Remains on list due to copper and zinc.
Gila River Centennial Wash - Gillespie Dam	AZ15070101-008	Turbidity	3 - Change in standard (moved to Category 4D).	No. Remains on list due to fish consumption advisory (DDT metabolites, toxaphene and chlordane in fish), boron, and selenium.
Hassayampa River headwaters - Copper Creek	AZ15070103-007A	Zinc	1 - TMDLs for cadmium, copper, and zinc approved in 2002. (Cadmium and copper were delisted in 2002; however, TMDLs had already been drafted.)	Yes.
Mineral Creek Devils Canyon - Gila River	AZ15050100-012B	Beryllium	3 - Change in standard. New beryllium standard is not exceeded in current and historic data.	No. Remains on list due to copper and selenium.
		pH	2 - Current data indicates uses are being attained. (Remediation activities removing contaminants.)	
		Zinc	2 - Current data indicates uses are being attained. (Remediation activities removing contaminants.)	
Turkey Creek headwaters - tributary at 34°19'28"/112°21'28"	AZ15070102-036A	Cadmium	6 - Reach was split in 2002 due to changes in designated uses at 5000-foot elevation. All exceedances that resulted in a listing occurred in the lower reach (AZ15070102-036B).	Yes.
		Copper		
		Zinc		
Salt River Watershed				
Christopher Creek headwaters - Tonto Creek	AZ15060105-353	Turbidity	3 - Change in standard (moved to Category 4D).	No. Remains on list due to <i>Escherichia coli</i> .
Tonto Creek headwaters - unnamed tributary at 34°18'10"/111°04'14"	AZ15060105-013A	Turbidity	3 - Change in standard (moved to Category 4D).	Yes.
Tonto Creek unnamed tributary at 34°18'10"/111°04'14" - Haigler Creek	AZ15060105-013B	Turbidity	3 - Change in standard (moved to Category 4D).	Yes.
Tonto Creek Rye Creek - Gun Creek	AZ15060105-008	Turbidity	3 - Change in standard 2 - Current data shows no exceedances in 18 samples.	Yes.

Surface Water	Reach or Lake Number	Pollutant or Parameter of Concern Removed From List	Criteria For Delist	Delist Surface Water
Mule Gulch headwaters - above Lavender Pit	AZ15080301-090A	Copper	6 - Reach was split in 2002 due to differences in flow regime (headwaters reach is ephemeral). All exceedances that resulted in a listing occurred in the lower reaches (AZ15080301-090B and -009C).	Yes.
		pH		
		Zinc		
San Pedro - Willcox Playa - Rio Yaqui Watershed (No pollutants or surface waters being delisted.)				
Santa Cruz - Rio Magdalena - Rio Sonoyta				
Alum Gulch headwaters - 31°28'20"/110°43'51"	AZ15050301-561A	Cadmium	1 - TMDLs approved in 2003.	Yes.
		Copper		
		pH		
		Zinc		
Alum Gulch 31°28'20"/110°43'51" - 31°29'17"/110°44'25"	AZ15050301-561B	Cadmium	1 - TMDLs approved in 2003.	Yes.
		Copper		
		pH		
		Zinc		
Harshaw Creek headwaters - Sonoita Creek	AZ15050301-025	Zinc	1 - TMDLs for copper, pH, and zinc were approved in 2003. (Note copper and pH were delisted in 2002; however, TMDLs had already been drafted.)	Yes.
Nogales and East Nogales Washes Mexico border - Potrero Creek	AZ15050301-011	Fecal coliform	2 - Change in standard. Now listed due to <i>Escherichia coli</i> exceedances.	No. Remains on list due to chlorine and <i>Eshcerichia coli</i> .
		Turbidity	3 - Change in standard (moved to Category 4D).	
Potrero Creek Interstate 19 - Santa Cruz River	AZ15050301-500B	Fecal coliform	3 - Change in standard. Meeting new <i>Escherichia coli</i> standards. (No exceedance in 15 samples.)	Yes.
Santa Cruz River Mexico border - Nogales WWTP	AZ15050301-010	Fecal coliform	3 - Change in standard. Now listed due to <i>Escherichia coli</i> exceedances.	No. Remains on list due to <i>Eshcerichia coli</i> .
Santa Cruz River Nogales WWTP - Josephine Canyon	AZ15050301-009	Fecal coliform	3 - Change in standard. Meeting new <i>Escherichia coli</i> standards. (No exceedance in 15 samples.)	Yes.
Santa Cruz River Josephine Canyon - Tubac Bridge	AZ15050301-008A	Fecal coliform	3 - Change in standard. Meeting new <i>Escherichia coli</i> standards. (No exceedance in 16 samples.)	Yes.
		Turbidity	3 - Change in standard (moved to Category 4D).	
Santa Cruz River Tubac Bridge - Sopori Wash	AZ15050301-008B	Fecal coliform	3 - Change in standard. Meeting new <i>Escherichia coli</i> standards. (No exceedance in 17 samples.)	Yes.

Surface Water	Reach or Lake Number	Pollutant or Parameter of Concern Removed From List	Criteria For Delist	Delist Surface Water
Three R Canyon headwaters - 31°28'35"/110°46'19"	AZ15050301-558A	Cadmium	1 - TMDLs approved in 2003.	Yes.
		Copper		
		pH		
		Zinc		
Three R Canyon 31°28'35"/110°46'19"-31°28'27"/110°47'12"	AZ15050301-558B	Cadmium	1 - TMDLs approved in 2003.	Yes.
		Copper		
		pH		
		Zinc		
Three R Canyon 31°28'27"/110°47'12" - Sonoita Creek	AZ15050301-558C	Cadmium	1 - TMDLs approved in 2003.	Yes.
		Copper		
		pH		
		Zinc		
Upper Gila Watershed				
Gila River Bonita Creek - Yuma Wash	AZ15040005-022	Turbidity	3 - Change in standard (moved to Category 4D).	No. Remains on list due to <i>Escherichia coli</i> .
San Francisco River Limestone Gulch - Gila River	AZ15040004-001	Turbidity	3 - Change in standard (moved to Category 4D).	Yes.
Verde Watershed				
Beaver Creek Dry Beaver Creek - Verde River	AZ 15060202-002	Turbidity	3 - Change in standard (moved to Category 4D).	Yes.
Oak Creek Below Slide Rock State Park - Dry Creek	AZ15060202-018B	Turbidity	3 - Designated use changed from A&Wc to A&Ww because reach is below 5000-foot elevation. Current and historic turbidity data would not exceed former turbidity standard for A&Ww.	Yes.

Which TMDLs will ADEQ do next?

Priority Ranking and Scheduling TMDLs – The Clean Water Act and federal regulations (40 CFR 130.7) require the state to establish a priority ranking for each surface water on the 303(d) List. The criteria for this ranking and which TMDLs will be targeted for initiation within the next two years is established in the Impaired Waters Rule (R18-11-606) (**Appendix B**). Arizona's ranking system reflects the relative value and benefits of each surface water to the state and considers, among other factors:

- The severity of the impairment in relation to the designated uses, especially threats to human health, aquatic life and wildlife;
- Surface waters where endangered or threatened species exist and the pollutant is likely to further jeopardize the listed species;
- Other pertinent information such as: economic or aesthetic importance, the complexity of the TMDL, degree of public interest, permitting issues, an impending change in water quality standard or designated use, and date when the surface water was first placed on the 303(d) List.

Specific factors considered in prioritizing and scheduling impaired surface waters for TMDL development are listed as footnotes at the end of **Table 31**. As a surface water may have a mixture of high, medium, and low priority factors, the final priority ranking considers all factors but weighs some factors more heavily than others. **Table 31** indicates which factors were applied, which were weighed more heavily, and provides a brief discussion of the final priority ranking determination.

In general, the surface water was automatically listed as high priority, and ADEQ will initiate development of the associated TMDL within two years following EPA's approval of the 303(d) List, if there is a substantial threat to health and safety of humans, aquatic life, or wildlife. This determination was based on the following four factors:

- The magnitude of the exceedance. For example, the laboratory result was more than twice the standard.
- The duration or persistence of the problem. For example, more than half the samples exceeded standards.
- The standard was established to protect human health or wildlife from imminent harm. For example, the acute toxic Aquatic and Wildlife standards were established based on short-term exposures rather than long-term or life-time exposures.
- A Threatened or Endangered species (T&E species) may be further

jeopardized by the water quality problem. This was determined by using the following information provided by the Arizona Game and Fish Department and the US Fish and Wildlife Service:

- ▶ A T&E species has been confirmed within a mile of the surface water listed or the surface water is within "critical habitat" established for the species;
- ▶ A standard to protect aquatic and wildlife has been exceeded, and
- ▶ The published reasons for decline and vulnerability of the species indicate that the pollutant or source of the exceedance may further jeopardize this species.

Several low priority factors may take precedence over high priority factors because completing a TMDL at this time would either not be appropriate, be premature, or be an inefficient use of resources. These factors included:

- ADEQ has formally submitted to EPA a proposal to delist the surface water or pollutant.
- ADEQ has adopted a new surface water quality standard or designated use that is currently being reviewed by EPA for approval. When approved, the standard would no longer be violated.
- The surface water is expected to attain surface water quality standards before the next listing cycle due to:
 - ▶ Recently instituted treatment levels or best management practices in the drainage area,
 - ▶ Discharges or activities related to the impairment have ceased, or
 - ▶ Actions have been taken and the controls are in place or firmly scheduled for implementation that are likely to bring the surface water back into compliance.
- The water quality problem can be resolved only through the cooperative actions of an agency outside the state or federal jurisdiction (e.g., Mexico, another state, or Indian reservation).

EPA may also revise this schedule during its review process. Or it may become necessary to shift priority ranking of a surface water due to significant changes in resources to complete TMDLs or new information obtained concerning one of the priority factors. Such changes would be negotiated with EPA and would be made known to the public through the TMDL status page on ADEQ's web site: www.adeq.state.az.us.

Table 31. TMDL Priority Ranking and Schedule
(Based on ADEQ submission to EPA for approval in April 2004)
(See key to priority factors on p. 50)

Surface Water Identification		Pollutant	Year First Listed	H 1	H 2	H 3	H 4	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8	L 9	RANKING	TIME TABLE
(See key to priority factors on p. 55)																												
Bill Williams Watershed																												
Alamo Lake 1,414 acres AZL15030204-0040	Mercury (in fish tissue)	1998 (2002 EPA)	X			X			X							X	X						X				High priority.	Initiated monitoring and investigation in 2003. Initiate TMDL in 2004. Complete TMDL in 2005.
	Excess mercury in fish tissue can be toxic to humans and other animals that eat the fish (H1). Fish in this lake are a food source for the bald eagle (a federally-listed Threatened species) (H4) and the lake supports significant sport fishing (H7). ADEQ will be coordinating research for potential mercury sources for the three mercury listings in this watershed as they may have common sources (M5, M6). Currently there is insufficient data to determine sources or critical conditions (L6).																											
	pH	1996				X			X		X						X										Medium priority	Ongoing fixed station monitoring by US Fish and Wildlife Service. Initiate TMDL in 2008. Complete TMDL in 2009.
	ADEQ is currently establishing criteria to classify its lakes which may result in changes in assessment status (M6). Classification is to be completed by 2004. High pH may indicate eutrophication problems that may lead to fish kills (H4, H7). The pH level exceeds standard for A&Ww, FBC, and AgL (M1).																											
Boulder Creek Unnamed tributary at 34°41'14"/113°18'00" - Wilder Creek 29 miles AZ15030202-006B	Mercury	2004	X													X	X					X					High priority.	Initiated monitoring and investigation in 2003. Initiate TMDL in 2004. Complete TMDL in 2005.
	The mercury presents a significant threat to aquatic life and animals that prey on these species (including humans). Dissolved mercury as high as 3.4 ug/L, which is 340 times the chronic standard, and almost 6 times the Fish Consumption standard (H1). Boulder Creek drains to Burro Creek and Alamo Lake which are also on the 303(d) List for mercury. ADEQ will be coordinating research for potential mercury sources for the three mercury listings in this watershed as they may have common sources (M5, M6). Currently there is insufficient data to determine sources or critical conditions (L6).																											
Boulder Creek Wilder Creek - Copper Creek 3 miles AZ15030202-005A	Arsenic	1988						X					X		X	X					X	X					High priority.	Arsenic, copper and zinc TMDLs are complete and submitted to EPA for approval in 2003.
	Copper	1988	X					X				X		X	X					X								
	Zinc	1988	X					X				X		X	X					X								
	Copper and zinc present a significant threat to wildlife due to the toxic nature of these pollutants and the magnitude of the exceedances as follows: * Dissolved copper results as high as 14,400 µg/L, which is 220 times higher than the standard (H1); * Dissolved zinc results as high as 115,000 µg/L, which is 300 times higher than the standard (H1). Boulder Creek has intermittent flow (L4). Arsenic poses a low human-health threat on this remote stream which has nominal recreation (L5). (Note: Investigations indicate that arsenic impairs the entire reach, while copper and zinc impair the segment between Wilder Creek and Butte Creek, which is below the upper tailings pile.) BLM, Arizona State Land Dept, and private land owners are coordinating efforts to clean up contaminated sites.																											
	Mercury	2004	X													X	X					X					High priority.	Initiated monitoring and investigation in 2003. Initiate TMDL in 2004. Complete TMDL in 2005
	The mercury presents a significant threat to aquatic life and animals that prey on these species (including humans). Boulder Creek drains to Burro Creek and Alamo Lake which are also on the 303(d) List for mercury. ADEQ will be coordinating research for potential mercury sources for the three mercury listings in this watershed as they may have common sources (M5, M6). Currently there is insufficient data to determine sources or critical conditions (L6).																											

Surface Water Identification	Pollutant	Year First Listed	H 1	H 2	H 3	H 4	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8	L 9	RANKING	TIME TABLE **	
Burro Creek Boulder Creek - Black Canyon 17 miles AZ15030202-004	Mercury	2004	X												X	X						X				High priority.	Initiated monitoring and investigation in 2003. Initiate TMDL in 2004. Complete TMDL in 2005.	
The mercury presents a significant threat to aquatic life and animals that prey on these species (including humans). * Dissolved mercury as high as 3.8 ug/L, which is 380 times the chronic standard, and 6 times the Fish Consumption standard (H1). Burro Creek drains to Alamo Lake which is also on the 303(d) List for mercury. ADEQ will be coordinating research for potential mercury sources for the three mercury listings in this watershed as they may have common sources (M5, M6). Currently there is insufficient data to determine sources or critical conditions (L6).																												
Colorado-Grand Canyon Watershed																												
Paria River Utah border - Colorado River 29 miles AZ14070007-123	Selenium	2004														X							X			Medium priority.	Monitoring completed in 2001 (to support another TMDL). Initiate TMDL in 2004. Complete TMDL in 2005.	
Prior monitoring and investigations in this drainage should help support TMDL development; however, further investigation is needed to determine whether most or all of the selenium is naturally occurring (L8).																												
Colorado-Lower Gila Watershed																												
Gila River Coyote Wash - Fortuna Wash 28 miles AZ15070201-003	Boron	2004													X						X	X				Medium priority.	Initiate monitoring and investigations in 2009 (ongoing fixed station monitoring). Initiate TMDLs in 2010. Complete TMDLs in 2011.	
	Selenium	2004													X							X						
Elevated selenium and boron may be associated with the extensive agriculture in the area; however, monitoring is needed to determine sources (M5, L6). Boron concentrations found may impact downstream agricultural uses but present a low ecological and human health risk (L5).																												
Painted Rocks Borrow Pit Lake 180 acres AZL15070201-1010	Dissolved oxygen	1992																		X	X			X		Low priority.	Update feasibility study and determine need for TMDL in 2007. Initiate monitoring for TMDL in 2009 (ongoing fixed station monitoring by US Fish and Wildlife Service). Initiate TMDL in 2010. Complete TMDL in 2012.	
	DDT metabolites, toxaphene, chlordane in fish tissue	1988 (EPA 2002)	X			X									X					X		X				Medium priority.		
A 1992 diagnostic feasibility study by ADEQ investigated the causes of low dissolved oxygen. That study indicated that low dissolved oxygen is due to design and maintenance of this shallow lake and suggested strategies to improve water quality. Drought conditions have reduced lake levels and may be related to some of the low dissolved oxygen readings (L8). During the past year, the lake has been dry and representative water samples at the lake could not be collected (L4). The lake is no longer being stocked with fish and does not have recreational uses because of historic pesticide contamination and fish consumption advisories (L5). There is no public access, thus the public health risk due to fish tissue contamination is significantly reduced; however, these pesticides still present a high risk to aquatic life and species that prey on them (H1). The pesticides may present a risk to the federally protected Yuma clapper rail sighted in this area (H4). The TMDLs will be complex due to the size of the drainage and potential sources (M5) and will require significant monitoring resources to determine the sources of this historic pesticide (L6).																												
Little Colorado-San Juan Watershed																												
Little Colorado River Silver Creek - Carr Wash 6 miles AZ15020002-004	Escherichia coli	2004	X									X		X								X				Medium priority.	Initiate monitoring and investigation in 2005. Initiate TMDL in 2006. Complete TMDL in 2007.	
Exceedances of the Escherichia coli standard may represent a significant public health concern if people are swimming or even wading in the water (H1). Exceedances may be related to wet weather events (M3). The drainage area is more than 8,000 square miles so determining the source of contamination may be complex and will require substantial monitoring data to identify sources (M5, L6). ADEQ will initiate this monitoring while it collects data for other TMDLs along the Little Colorado River (M6).																												

Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **	
Little Colorado River Porter Tank-McDonalds Wash 17 miles AZ15020008-017	Copper	1992	X					X							X							X		X		High priority.	Initiate monitoring and investigation in 2005. Initiate TMDL in 2006. Complete TMDL in 2007.	
	Silver	1992	X					X							X							X		X				
	Copper and silver TMDLs are a high priority due to the toxic nature of these heavy metals and the frequency of exceedances (9 out of 11 samples exceeded the copper standard, and 2 out of 9 samples exceeded the silver standard) (H1). Data from a USGS study concluded that the metals may be naturally elevated (L8); however, sources and natural loading concentrations need to be further studied (L6). The Little Colorado River Multiple Objective Management watershed group is interested in this TMDL (H6). The nature of these pollutants make this study very complex (M5).																											
Lake Mary (lower) 660 acres AZL15020015-0890 Lake Mary (upper) 760 acres AZL15020015-0900	Mercury (in fish tissue)	2002	X						X												X		X			High priority.	ADEQ initiated TMDL monitoring and investigation in 2003. Initiate TMDL in 2004. Complete TMDL in 2004.	
			Fish consumption advisory has been issued (H1). Normally the lake is a significant public recreational area (H7); however, due to a long drought, the lake has been dry at times during the past year. Also, due to the drought it may be difficult to obtain sufficient water samples to identify sources (L4) (L6).																									
Middle Gila Watershed																												
Alvord Park Lake 27 acres AZL15060106B-0050	Ammonia	2004	X						X							X						X				High priority.	Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.	
			Ammonia poses a significant threat to aquatic life due to its toxic nature (H1). This lake is an important urban recreational area (H7). More investigation is needed to determine the source of the pollutants (L6). ADEQ is currently establishing criteria to classify its lakes which may result in changes in assessment status (M6).																									
Chaparral Lake 13 acres AZL15060106B-0300	Low dissolved oxygen	2004						X								X						X				Medium priority.	Initiate monitoring and investigations in 2007. Initiate TMDLs in 2008. Complete TMDLs in 2009.	
			ADEQ is currently establishing criteria to classify its lakes which may result in changes in assessment status (M6). Low dissolved oxygen may result in fish kills and this lake is an important urban recreational area (H7). More investigation is needed to identify the sources of pollutants causing the low dissolved oxygen (L6)																									
	Escherichia coli	2004						X								X						X				Medium priority.		
Although exceedances of <i>Escherichia coli</i> standards represent a risk to public health, swimming or wading in the lake is prohibited. This lake is an important urban recreational area (H7). More investigation is needed to identify the sources of pollutants causing the bacterial contamination. Both TMDLs in this lake will be developed at the same time for efficiency (M6).																												
Cortez Park Lake 2 acres AZL15060106B-0410	Low dissolved oxygen	2004						X								X						X				Medium priority.	Initiate monitoring and investigations in 2007. Initiate TMDLs in 2008. Complete TMDLs in 2009.	
	pH	2004						X		X	X					X						X						
	ADEQ is currently establishing criteria to classify its lakes, which may result in changes in assessment status (M6). Both TMDLs will be developed at the same time for efficiency (M6). Low dissolved oxygen and high pH may result in fish kills and this lake is an important urban recreational area (H7). More investigation is needed to identify the sources of pollutants causing these water quality problems (L6).																											

Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **	
French Gulch headwaters-Hassayampa River 10 miles AZ15070103-239	Copper	1994	X										X		X	X					X					High priority.	TMDL study ongoing. Completion TMDL in 2004.	
	Zinc	1994	X										X		X	X					X							
	Although this reach is ephemeral (L4), the toxic nature of copper and zinc, along with the magnitude and duration of exceedances, pose a significant threat to wildlife which may drink pools remaining after monsoon rains or winter storms (H1): * Dissolved copper was measured as high as 1200 µg/L (almost 20 times the aquatic and wildlife standard), and exceeded the standards in 80 of 135 samples (60%); * Dissolved zinc was measured as high as 2260 µg/L (almost 6 times the aquatic and wildlife standard), and exceeded standards in 36 of 170 samples (20%). The TMDL investigation is on ADEQ's work plan for 2003-2004 (M6); however, the TMDL is expected to be very complex due to the nature of the pollutants (M5) and seasonal variation (M3).																											
A. Gila River 1. Salt River - Agua Fria River AZ15070101-015 2. Agua Fria River - Waterman Wash AZ15070101-014 3. Waterman Wash - Hassayampa River AZ15070101-010 4. Hassayampa River - Centennial Wash AZ15070101-009 5. Centennial Wash - Gillespie Dam AZ15070101-008 6. Gillespie Dam - Rainbow Wash AZ15070101-007 7. Rainbow Wash - Sand Tank AZ15070101-005 8. Sand Tank - Painted Rocks Reservoir B. Painted Rocks Reservoir AZL15070101-1020A (C. Painted Rocks Borrow Pit Lake - See Colorado-Lower Gila Watershed) D. Salt River 23 rd Ave WWTP - Gila River AZ15060106B-001D E. Hassayampa River Buckeye Canal - Gila River AZ15070103-001B Total 99 miles and 100 acres	DDT metabolites, toxaphene, chlordane in fish tissue	1988 (EPA 2002)	X			X									X											Medium priority.	Initiate monitoring and investigations in 2006. Initiate TMDLs in 2009. Complete TMDLs in 2010.	
These pesticides still present a high risk to aquatic life and species that prey on them (H1). The pesticides may present a risk to the federally protected Yuma clapper rail sighted in this area (H4). This will be a very complex TMDL due to the size of the drainage and potential sources (M5). The TMDL will require significant monitoring resources to determine the sources of this historic pesticide (L6).																												
Gila River Centennial Wash-Gillespie Dam 5 miles AZ15070101-008	Boron	1992							X				X		X								X				Medium priority.	Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.
This TMDL will be complex due to large number of potential sources and seasonal influences (M5, M3, L6). Boron may negatively impact agricultural crop production (H7); however, ADEQ is unaware of any documented impacts. Although the federally protected Yuma clapper rail and willow flycatcher have been sighted in this area, boron levels are <u>not</u> exceeding the aquatic and wildlife water quality standard. This TMDL investigation will be coordinated with the pesticide TMDLs (see below) (M6).																												

Surface Water Identification	Pollutant	Year First Listed	H 1	H 2	H 3	H 4	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8	L 9	RANKING	TIME TABLE **	
Mineral Creek Devils Canyon-Gila River 10 miles AZ15050100-012B	Copper	1992	X										X	X	X				X	X							Low priority.	Surface water to be in compliance with copper standards by April 2004 according to the signed consent decree. Initiate monitoring and investigations in 2006. Initiate TMDLs in 2008. Complete TMDLs in 2009.
	The copper poses some risk to public health and wildlife due to its toxicity (H1); however, based on a consent decree actions have been taken and have been generally successful at mitigating this contamination (M4)(L3). The mine monitors multiple sites on a monthly basis to evaluate the effectiveness of its actions. Further enforcement actions will be taken if compliance is not attained per consent decree by April 2004 (L3). Copper exceedances after treatment were related to storm flow (M3), and determining the source of copper during such storm flows may be complex due to historic mining, intermittent flow upstream, and natural sources (M5, L4).																											
	Selenium	2004														X					X		X				Medium priority	
Insufficient data exist to determine the source of the pollutant loads (L6). Determining the source of selenium may be complex due to historic mining, intermittent flow upstream, and natural sources (M5, L4).																												
Queen Creek 1. headwaters-Superior Mine WWTP 9 miles AZ15050100-014A 2. Superior Mine WWTP - Potts Canyon AZ15050100-014B	Copper	2002 (reach A) 2004 (reach B)											X		X					X		X					Medium priority.	Initiate monitoring and investigation in 2004. Initiate TMDL in 2005. Complete TMDL in 2006.
	A copper TMDL will be complex (M5) due to intermittent flows (L4), the nature of the pollutant (M5) and the probability that contamination is related to storm water runoff events (M3). More samples are needed to identify sources and evaluate the extent of contamination (L6). Although copper is toxic to aquatic life and wildlife, the copper listings are based on only two exceedances in nine samples and exceedances are just above standards.																											
Turkey Creek headwaters-Poland Creek 30 miles AZ15070102-036	Cadmium	1992	X					X					X	X	X	X					X						High priority.	TMDL study ongoing. Anticipate completing TMDLs in 2004.
	Copper	1992	X					X					X	X	X	X					X							
	Zinc	1992	X					X						X	X	X	X					X						
Cadmium, copper, and zinc pose a significant threat to wildlife due to the toxic nature of these pollutants, and the magnitude and frequency of exceedances as follows (H1): * Dissolved cadmium was measured as high as 931 µg/L (8 times the standard), and exceeded standards in 2 of 5 samples (40%); * Dissolved copper was measured as high as 13,600 µg/L (200 times the standard) and exceeded standards in 3 of 5 samples (60%); * Dissolved zinc was measured as high as 158,000 µg/L (more than 400 times the standard) and exceeded standards in 3 out of 5 samples. The Forest Service is supporting the development of this TMDL and is developing plans to remediate mine waste piles along this reach (H6). The TMDL investigation is on ADEQ's 2003-2004 work plan (M6) but is complex due to the nature of metals and the length of the listed stream segment (21 miles). Metal contamination may be localized, exceedances are storm dependent, and flow is intermittent (M3, M5, and L4).																												
Salt Watershed																												
Canyon Lake 450 acres AZL15060106A-0250	Low dissolved oxygen	2004						X					X			X						X					Medium priority	Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.
			This lake is an important recreational area (H7). Low dissolved oxygen may be related to seasonal activities (M3). More data are needed to identify sources (L6). ADEQ is currently establishing criteria to classify its lakes, which may result in changes in assessment status (M6).																									
Christopher Creek headwaters-Tonto Creek 8 miles AZ15060105-353	Escherichia coli	2004	X					X				X									X					High priority	Ongoing TMDL investigation. TMDL to be completed in 2004.	
			Exceedances of the Escherichia coli standard indicate a risk to public health (H1). Portions of this stream receive extensive recreational use (H7). Exceedances appear to be related to storm water flows (M3), but more data are needed to identify sources (L6).																									

Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **	
Crescent Lake 157 acres AZL15060101-0420	pH	2002							X		X					X						X				Medium priority.	Initiate monitoring and investigation in 2007 Initiate TMDL in 2008. Complete TMDL in 2009.	
ADEQ is currently establishing criteria to classify its lakes, which may result in changes in assessment status (M6). This lake is an important fishing area and high pH levels may be associated with fish kills (last reported fish kill was in 1998) (H7). More monitoring data is needed to identify pollutants causing the high pH and sources of the pollutants (L6).																												
Pinto Creek Ripper Spring - Roosevelt Lake 18 miles AZ15060105-353	Selenium	2004		X																		X				Medium priority.	Initiate monitoring and investigation in 2007 Initiate TMDL in 2008. Complete TMDL in 2009.	
An AZPDES permit is pending for a large mining operation on this reach (H2). More data are needed to identify sources (L6).																												
Salt River Stewart Mnt Dam - Verde River 10 miles AZ15060106A-003	Low dissolved oxygen	2004							X				X									X				Medium priority	Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.	
This section of the Salt River is an important recreational area (H7). Low dissolved oxygen may be related to seasonal activities (M3). More data is needed to identify sources (L6).																												
San Pedro-Willcox Playa-Rio Yaqui Watershed																												
1. Mule Gulch above Lavender Pit - WWTP Bisbee 1 miles AZ15080301-090B 2. Mule Gulch WWTP Bisbee - Highway 80 Bridge 4 miles AZ15080301-090C	Copper - 090B	2002	X										X		X	X					X				X	Medium priority.	Ongoing TMDL investigation and monitoring. Site-specific standard development to be completed in 2004. Complete TMDL in 2005.	
	pH - 090B	2002 (EPA)	X										X		X	X					X				X			
	Cadmium - 090C	2004	X										X		X	X					X				X			
	Copper - 090C	1990	X										X		X	X					X				X			
	pH - 090C	1990	X								X		X		X	X					X				X			
	Zinc - 090C	1990	X										X		X	X					X				X			
TMDLs are underway to address loadings on both segments of Mule Gulch and tributaries contributing significant loading. These TMDLs are complex due to the wastewater discharges, slope, intermittent and ephemeral flows, lack of rain, and natural background levels of copper (M3, M5, L4, L8). Currently ADEQ is developing site specific standards that account for loadings from naturally occurring conditions (M6, L8). The mining operation in the affected segments is implementing and continuing to develop additional Best Management Practices to address contamination issues. Copper, zinc, and low pH present a significant threat to wildlife and human health (H1) due to the toxic nature of these pollutants and the magnitude and frequency of the exceedances: * Dissolved copper was as high as 12,000 µg/L (185 times the aquatic and wildlife standard) and exceeded standards in 20 of 36 samples (55%) in Mule Gulch; * Dissolved zinc was as high as 3760 µg/L (10 times the aquatic and wildlife standard) and exceeded standards in 14 of 36 samples (39%) in Mule Gulch; * This area is a documented corridor for Mexican migrant traffic. Every summer migrants die of thirst crossing Arizona's desert and may drink from reaches of Mule Gulch with flow. Consumption of this water would be hazardous due to the high metal content. Note: drought has slowed sampling and the development of these TMDLs.																												

Surface Water Identification	Pollutant	Year First Listed	H 1	H 2	H 3	H 4	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8	L 9	RANKING	TIME TABLE **
San Pedro River Babocomari Creek - Dragoon Wash 17 miles AZ15050202-003	<i>Escherichia coli</i>	2004	X										X		X	X							X	X		Medium priority.	Initiate monitoring and investigation in 2005. Initiate TMDL in 2006. Complete TMDL in 2007.
Exceedances of the <i>Escherichia coli</i> standard may represent a significant public health concern if people are swimming or even wading in the water (H1). Exceedances may be related to wet weather events (M3). The drainage area is relatively large and includes an area of Mexico, so determining the source of contamination may be complex and will require substantial monitoring data to identify sources (M5, L6, L7). Monitoring and investigation for the two reaches of the San Pedro River listed due to <i>Escherichia coli</i> will be coordinated (M6).																											
San Pedro River Dragoon Wash-Tres Alamos 16 miles AZ15050202-002	Nitrate	1990												X	X				X							Low priority.	Ongoing Superfund Cleanup remediation activities and effectiveness monitoring in this area. Initiate monitoring for TMDL in 2010. Initiate TMDL in 2011. Complete TMDL in 2012.
The ADEQ WQARF (Superfund) Program is working with this site. The facility has instituted several actions to bring the surface and ground water into compliance with its standards and is conducting monthly monitoring of several sites along the San Pedro River (L3, M4). Although surface water quality is improving, cleanup will take time as there is significant contamination of the ground water which is seeping into the San Pedro (M5).																											
San Pedro River Aravaipa Creek - Gila River 15 miles AZ15050203-001	<i>Escherichia coli</i>	2004	X										X		X	X							X	X		Medium priority.	Initiate monitoring and investigation in 2005. Initiate TMDL in 2006. Complete TMDL in 2007.
Exceedances of the <i>Escherichia coli</i> standard may represent a significant public health concern if people are swimming or even wading in the water (H1). Exceedances may be related to wet weather events (M3). The drainage area is relatively large and includes an area of Mexico, so determining the source of contamination may be complex and will require substantial monitoring data to identify sources (M5, L6, L7). Monitoring and investigation for the two reaches of the San Pedro River listed due to <i>Escherichia coli</i> will be coordinated (M6).																											
Santa Cruz-Rio Magdalena-Rio Sonoyta Watershed																											
Cienega Creek headwaters - Gardner Canyon 16 miles AZ15050302-006A	<i>Escherichia coli</i>	2004	X		X																	X				High priority.	Initiate monitoring and investigation in 2004. Initiate TMDL in 2005. Complete TMDL in 2006.
This water is classified as a Unique Water and should be protected from degradation (H3). Exceedances of the <i>Escherichia coli</i> standard may represent a significant public health concern if people are swimming or even wading in the water (H1). More monitoring and investigation is needed to determine potential sources of the bacterial contamination.																											
Lakeside Lake 15 acres AZL15050302-0760	Low dissolved oxygen	2004		X					X				X		X											High priority.	Ongoing monitoring and investigation. TMDL will be completed in 2004.
An AZPDES permit revision is pending for a discharge to this lake (H2, M6). Low dissolved oxygen may be related to occasional fish kills at this lake, and the lake is an important urban recreational area (H7). Low dissolved oxygen may be related to seasonal activities (M3).																											
Nogales & East Nogales Wash Mexico border-Portrero Wash 6 miles AZ15050301-011	Chlorine	1996	X										X										X			High priority.	Ongoing quarterly monitoring. Necessity of TMDL will be based on outcome of current international discussions.
	<i>Escherichia coli</i>	1998	X										X										X				
Exceedances of the <i>Escherichia coli</i> standard may represent a significant public health concern if people are swimming or even wading in the water (H1). This area is a corridor for Mexican migrants who may consume this water while crossing the desert, although the water is not protected for this use (H1). Although fecal coliform and chlorine are a significant threat to human health and wildlife (H1), actions to correct the situation are dependent on ongoing international negotiations between the U.S. government, Arizona, Mexico, the cities of Nogales, AZ and Nogales, Sonora, and the Mexican state of Sonora (L7, M4). Wastewater infrastructure in Mexico is badly deteriorated and must be replaced. Chlorine is sometimes added directly to the stream on the U.S. side of the border due to raw sewage overflows from Mexico. The source loadings are known and the technical means to correct the problem have been determined (M4).																											

Surface Water Identification	Pollutant	Year First Listed	H 1	H 2	H 3	H 4	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8	L 9	RANKING	TIME TABLE **	
Santa Cruz River Mexico border-Nogales Intl WWTP 17 miles AZ15050301-010	<i>Escherichia coli</i>	2002	X					X													X		X	X		High priority.	Stream has been dry due to drought in 2002-2003. TMDL monitoring will be initiated when flow resumes. Hope to initiate TMDL monitoring by 2006. Initiate TMDL by 2007. Complete TMDL by 2008. (Note: Long-term fixed station monitoring site at the border.)	
Exceedances of the <i>Escherichia coli</i> standard may represent a significant public health concern if people are swimming or even wading in the water (H1). This area is a corridor for Mexican migrants who may consume this water while crossing the desert, although the water is not protected for this use (H1). The Friends of the Santa Cruz River, a volunteer monitoring group, is interested in maintaining high quality water in the Santa Cruz River (H6). Completing this TMDL may be complex due to probable sources in Mexico (L7), intermittent flows (L4), the current drought, and the need for more data to identify source loads (L6).																												
Sonoita Creek 750 feet below WWTP - Santa Cruz River 14 miles AZ15050301-013C	Zinc	2004																				X				Low priority.	Initiate monitoring and investigation 2011. Initiate TMDL in 2012. Complete TMDL in 2013.	
Zinc exceedances just above standards; therefore, they do not represent a significant ecological health concern. Source of zinc is unknown (L6); however, a wastewater treatment plant is directly upstream from the monitoring site. Discharge monitoring reports from this treatment plant will be reviewed, and if needed, water quality improvements will be pursued through enforcement actions.																												
Upper Gila Watershed																												
Gila River Skully Creek - San Francisco River 15 miles AZ15040002-001	Selenium	2004				?									X							X				Medium priority	Initiate monitoring and investigation in 2006. Initiate TMDL in 2007. Complete TMDL in 2008.	
Monitoring and investigation is needed to determine potential sources of selenium (L6). Sources may be coming in from New Mexico, adding to the complexity of the TMDL (M5).																												
Gila River Bonita Creek-Yuma Wash 6 miles AZ15040005-022	<i>Escherichia coli</i>	2004	X										X		X	X						X				Medium priority	Initiate monitoring and investigation in 2006. Initiate TMDL in 2007. Complete TMDL in 2008.	
Exceedances of the <i>Escherichia coli</i> standard may represent a significant public health concern if people are swimming or even wading in the water (H1). Exceedances may be related to wet weather events (M3). The drainage area is nearly 8,000 square miles, so determining the source of contamination may be complex and will require substantial monitoring data to identify sources (M5, L6). ADEQ will coordinate this investigation with the other <i>E. coli</i> TMDL downstream (M6).																												
Verde Watershed																												
Grande Wash headwaters - Ashbrook Wash 4 miles AZ15060203-991	<i>Escherichia coli</i>	2004	X	X																	X		X			High priority	Initiate monitoring and investigation in 2004. Initiate TMDL in 2005. Complete TMDL in 2006.	
Exceedances of the <i>Escherichia coli</i> standard may represent a significant public health concern if people are swimming or even wading in the water (H1). An unpermitted discharge may be the source of the bacterial contamination (H2). Reach is intermittent (L4). Need more samples to identify sources (L6).																												
Granite Basin Lake 7 acres AZL15060202-0580	Low dissolved oxygen	2004						X								X						X				Medium priority	Initiate monitoring and investigation in 2004. Initiate TMDL in 2005. Complete TMDL by 2006.	
ADEQ is currently establishing criteria to classify its lakes which may result in changes in assessment status (M6). Classification is to be completed by 2004. Low dissolved oxygen may result in fish kills, and this lake is an important urban recreational area (H7). More investigation is needed to identify the sources of pollutants causing the low dissolved oxygen (L6)																												
Whitehorse Lake 41 acres AZL15060202-1630	Low dissolved oxygen	2004						X								X						X				Medium priority	Monitoring and investigation initiated in 2001. Initiate TMDL in 2005. Complete TMDL in 2006.	
ADEQ is currently establishing criteria to classify its lakes which may result in changes in assessment status (M6). Classification is to be completed by 2004. Low dissolved oxygen may result in fish kills, and this lake is an important fishing area (H7). More investigation is needed to identify the sources of pollutants causing the low dissolved oxygen (L6)																												

X = Factor present. X = most significant factors. Note that factors that frequently out rank others are shown with an asterisk (*).

** Date shown is when action is to be initiated. Time table will be adjusted based on availability of flowing water, as Arizona is currently in a drought, and availability of resources to complete TMDLs.

High Priority Factors:

H1. Substantial threat to health and safety of humans, aquatic life, or wildlife based on:

- a. Number and type of designated uses impaired,
- b. Type and extent of risk from the impairment to human health or aquatic life,
- c. Pollutant causing the impairment, or
- d. Severity, magnitude, and duration the surface water quality standard was exceeded.

H2. A new or modified individual NPDES or AZPDES permit is sought for discharge to the impaired water.

H3. Surface water is listed as a Unique Water or is part of an area classified as a "wilderness area", "wild and scenic river" or other federal or state special protection of the water resource.

H4. Surface water contains a species listed as "threatened" or "endangered" under the federal Endangered Species Act and the presence of the pollutant in the surface water is likely to jeopardize the listed species.

H5. A delay in conducting the TMDL could jeopardize ADEQ's ability to gather sufficient credible data necessary to develop the TMDL.

H6. There is still significant public interest and support for development of a TMDL.

H7. The surface water or segment has important recreational and economic significance to the public.

H8. The pollutant has been listed for eight years or more (starting with the 2002 listing).

Medium Priority Factors:

M1. The surface water fails to meet more than one designated use.

M2. The pollutant exceeds more than one surface water quality standard.

M3. The exceedance is correlated to seasonal conditions caused by natural events such as storms, weather patterns, or lake turnover.

M4. Actions in the watershed may result in the surface water attaining applicable water quality standards; however, load reductions may take longer than the next 303(d) listing cycle.

M5. The type of pollutant and other factors relating to the surface water or segment make the TMDL very complex.

M6. ADEQ's administrative needs, including TMDL schedule commitments with EPA, permitting needs, or basin priorities that require completion of the TMDL.

Low Priority Factors:

L1. ADEQ has formally submitted a proposal to delist the surface water or pollutant to EPA. If ADEQ makes the submission outside of listing process cycle, the change in priority ranking will not be effective until EPA approves the report.

L2. ADEQ has modified or formally proposed a modification to the applicable surface water quality standard or designated use which would result in the surface water no longer being impaired, but the modification has not yet been approved by EPA.

L3. The surface water is expected to attain surface water quality standards due to any of the following:

- a. Recently instituted treatment levels or best management practices in the drainage area,
- b. Discharges or activities related to the impairment have ceased, or
- c. Actions have been taken and the controls are in place or scheduled for implementation that are likely to bring the surface water back into compliance.

L4. The surface water is ephemeral or intermittent. ADEQ shall re-prioritize the surface water if the presence of the pollutant in the listed water poses a threat to the health and safety of humans, aquatic life, or wildlife using the water (H1) or the pollutant is contributing to the impairment of a downstream, perennial surface water.

L5. The pollutant poses a low ecological and human health risk.

L6. Insufficient data exists to determine the source of the pollutant load.

L7. The uncertainty of timely coordination with national and international entities concerning international waters.

L8. Naturally occurring conditions are a major contributor to the impairment.

L9. No documentation or effective analytical tools exist to develop a TMDL for the surface water with reasonable accuracy.

VI. How Clean Is Surface Water in Arizona?

This chapter provides a statewide overview of the 2004 assessment. It is a summary of the individual surface water assessments provided in Chapter IV and V. These statistics are used by EPA in its published reports to Congress on the quality of water in the United States. The discussion and graphics in this section cannot be used to infer water quality in surface waters not assessed nor water on tribal lands in Arizona.

Water Quality in Streams, Canals, and Washes

For this assessment, 3,420 miles of streams, canals, and washes were assessed. **Figure 27** below illustrates the overall assessments of a stream reach by category (note that Category 2, "attaining some uses" and Category 3, "inconclusive" from Chapter V have been combined as "inconclusive"). It should be noted that the number of streams assessed is a small percentage of the approximately 90,375 miles of streams in Arizona; however, it includes 77% of the state's perennial stream miles (2,721 of the estimated 3,530 perennial miles). The

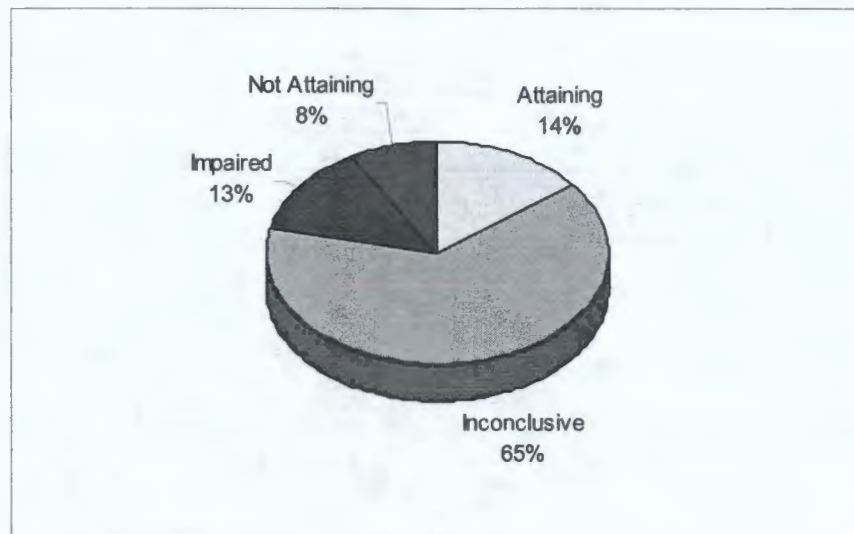


Figure 27. Use Support Assessments – Streams

primary goal of ADEQ's Ambient Monitoring Program is to monitor and assess all of Arizona's perennial stream miles and the majority of those with extended intermittent flow. Streams with ephemeral flow (flow only in direct response to precipitation) are a challenge to monitor and take much more time for a full assessment to be made.

As illustrated **Figure 28** below, relative use support is fairly consistent among all designated uses with the exception of Aquatic and Wildlife uses. Fish consumption, body contact, domestic water source, and agricultural uses all have approximately 40 - 60% attaining the use, 40 - 60% inconclusive and in need of further monitoring, and 5% or less impaired or not attaining.

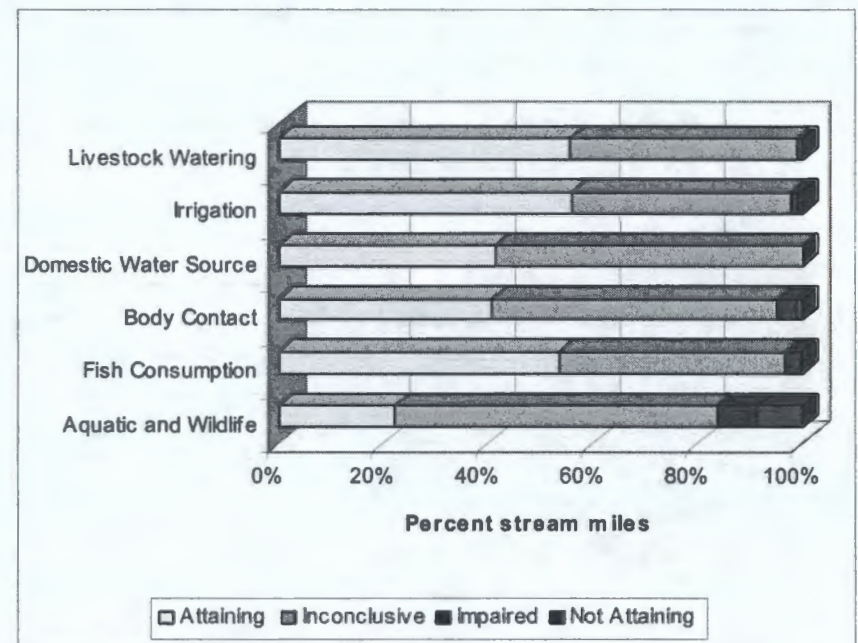


Figure 28. Use Support by Designated Use

For the Aquatic and Wildlife designated uses, approximately 25% of the streams assessed are attaining, 60% inconclusive, and 15% impaired and not attaining. Overall, there are fewer streams attaining the use than in 2002. There are a couple of reasons for this change. This assessment was the first one where ADEQ was able to apply chronic A&W standards, which are much more stringent than the acute ones used in the past. Acute standards are set higher to address short-term exposure, while chronic standard are set lower to protect for long-term exposure. Because chronic standards are so much lower, it was often the case that laboratory analyses did not produce detection limits low enough to assess chronic standards (detection limit was higher than the standard), resulting in an assessment of "inconclusive."

Another reason for the change in A&W use support is the repeal of the turbidity standard in 2002 and problems with the application of the new suspended sediment concentration standard. As a result, any waters impaired based on the former turbidity standard were assessed as not attaining (14 reaches), and any reaches with potential exceedances of the new SSC standard were assessed as inconclusive (9 reaches). (See further details in Chapter III under "Turbidity and the New SSC Standard.")

Table 32. Use Support Summary – Streams Assessed in 2004

Designated Uses	Attaining (miles)	Inconclusive (miles)	Impaired (miles)	Not Attaining (miles)	Total Assessed (miles)
Overall Use Support	493.8	2,191.6	446.5	288.2	3420.1
Aquatic and Wildlife	748.4	2,079	259.5	286.7	3,373.6
Fish Consumption	1,659.8	1,339.6	98.9	12.1	3,110.4
Body Contact	1,366	1,841.1	125.6	40.9	3,373.6
Domestic Water Source	257.3	367.1	0	0	624.4
Irrigation	1,060.7	798.8	33.6	11	1,904.1
Livestock Watering	1,662.2	1,304.4	3	31.9	3,001.5

Water Quality in Lakes and Reservoirs

Of approximately 168,800 acres of perennial lakes or reservoirs in Arizona (not on Indian lands), 76,433 were assessed. The relative distribution of lake assessments by category is illustrated in **Figure 29** below. ADEQ's goal is to assess all perennial, publicly-owned lakes over the next two watershed cycles.

Of the lake acres assessed, approximately 70% were inconclusive and 30% impaired or not attaining. "Attaining" acres constitute only 220 of the approximately 76,433 acres assessed, which is less than 1%. These lakes are rounded to "0%" in the graphic below.

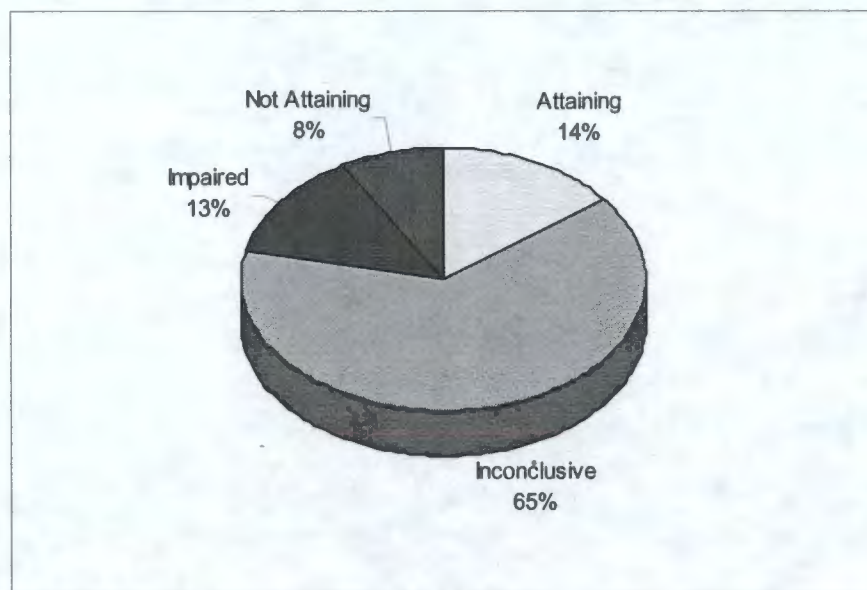


Figure 29. Use Support Assessments - Lakes

As illustrated in **Figure 30** below, the relative use support in lakes is consistent among Fish Consumption, Domestic Water Source, Irrigation, and Livestock Watering, with about 60% attaining, 30-40% inconclusive, and less than 5% impaired or not attaining. A larger percentage of lakes acres are inconclusive for the Aquatic and Wildlife use, largely due to application of chronic standards, and a lot more "not attaining," due to a number of nutrient TMDLs completed that addressed the A&W use. The large percentage of inconclusive lake acres for the Body Contact uses (Full and Partial) is mostly due to a lack of *Escherichia coli* data needed to make an assessment.

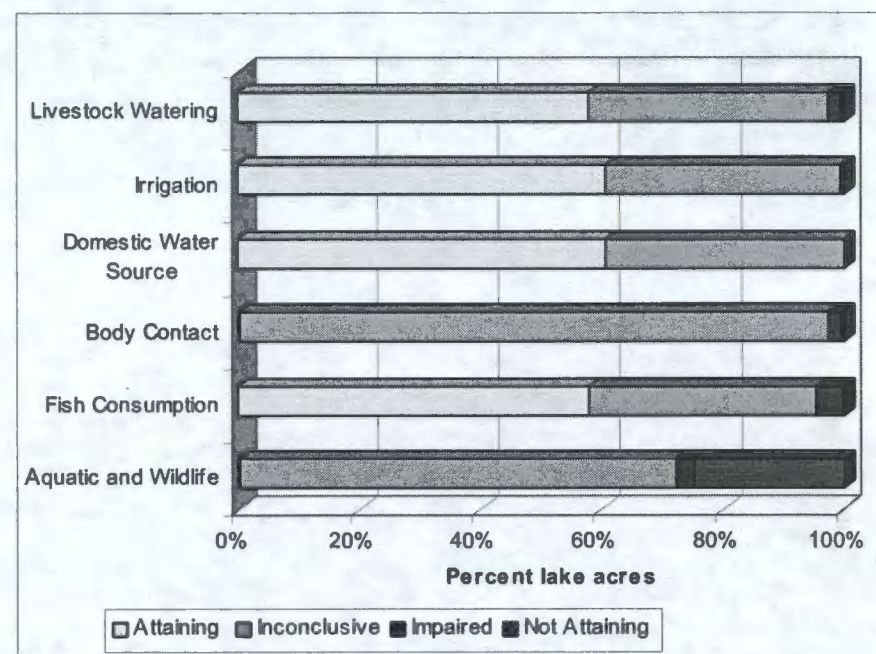


Figure 30. Use Support by Designated Use - Lakes

Table 33. Use Support Summary – Lakes Assessed in 2004

Designated Uses	Attaining (acres)	Inconclusive (acres)	Impaired (acres)	Not Attaining (acres)	Total Assessed (acres)
Overall Use Support	220	53,097.5	4,028	1,907	76,432.5
Aquatic and Wildlife	245	54,962.5	2,303	18,915	76,425.5
Fish Consumption	44,331	28,605.5	3,324	165	76,425.5
Body Contact	220	74,271.5	1,579	355	76,425.5
Domestic Water Source	40,692	26,319	0	0	67,011
Irrigation	43,725	28,027.5	152	235	72,139.5
Livestock Watering	43,869	29,747.5	1,564	355	75,535.5

What pollutants impair lakes and streams?

A pollutant is a substance causing a designated use to be assessed as “impaired” or “not attaining” due to repeated exceedances of a water quality standard. Pollutants identified in this assessment are summarized in **Tables 34 and 35** and compared in **Figures 31 and 32** below.

Table 34. Pollutants Impairing Arizona’s Streams – 2004

	Impaired or Not Attaining (miles)
Metals/Metalloids	
Arsenic	6
Boron	33.6
Cadmium	47.6
Copper	140.2
Mercury	34.6
Selenium	88.2
Silver	17.4
Zinc	79
*any metal	286.4
Pathogens	
<i>Escherichia coli</i>	119.5
Pesticides	
Chlordane	98.9
DDE	2.3
DDT	98.9
Toxaphene	98.9
Nutrients	
Nitrate	15.5
Low Dissolved Oxygen	10.1
Chlorine	6.2

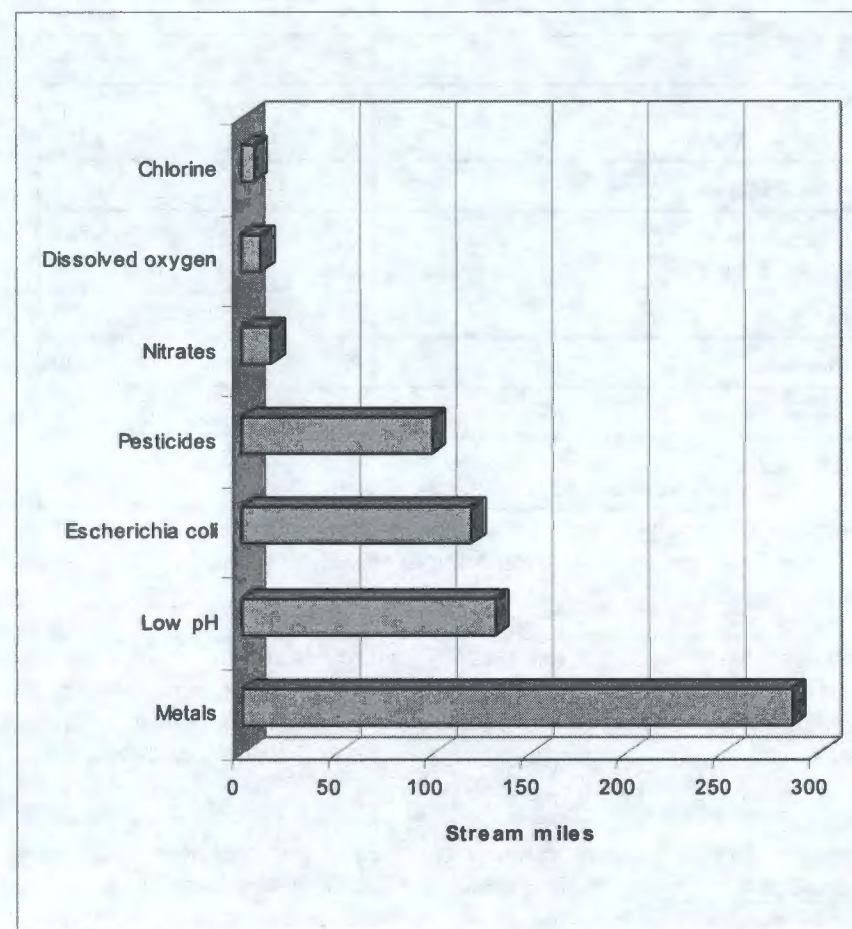


Figure 31. Pollutants Impairing Streams – 2004

Table 35. Pollutants Impairing Arizona's Lakes – 2004

	Impaired or Not Attaining (acres)
pH	6,148
Metals Mercury	3,204
Low Dissolved Oxygen	1,037
Pesticides	285
Chlordane	285
DDT	285
Toxaphene	285
Nutrients	230
Ammonia	27
Pathogens <i>Escherichia coli</i>	13

Information about pollutants impairing a specific lake or stream is provided in Chapter IV. General information about these pollutants and their sources follows below.

Metals – Metals can leach more readily from soil or mineralized rock that has been exposed by mining, road building or land development activities. Ore bodies can also naturally contribute metals to streams and ground water springs recharging streams. Arizona has extensive areas of mineralized rock, and therefore, a high potential for metals pollution.

To date, mercury has only been found to be a problem in Arizona's lakes, while the other metals are generally exceeding standards in streams. This is due to the characteristics of these metals. Generally metals (e.g., beryllium, cadmium, copper, manganese, mercury, silver, and zinc) rapidly adhere to sediment, with

the more toxic dissolved metals being present in surface water only for relatively short distances near mining sites or other potential sources. These discharges are located near streams in Arizona, and therefore, effect stream water quality. When metal-contaminated sediment is transported downstream to a lake, the water slows and the sediments drop to the bottom of the lake. Metals do not readily go back into a dissolved state in these relatively alkaline lakes, and the

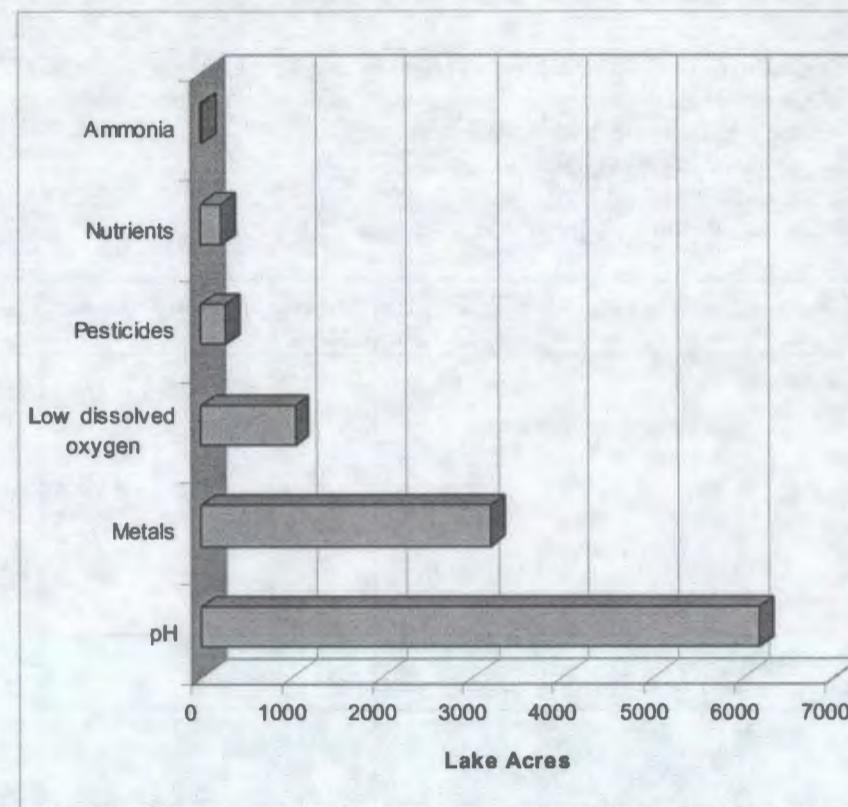


Figure 32. Pollutants Impairing Lakes – 2004 Assessment

contamination is buried under layers of sedimentation.

Mercury is an exception. Once elemental mercury is methylated by microbes in the bottom of the lake, methylmercury can then bioaccumulate in aquatic life. The concentration of mercury then biomagnifies (compounds) as contaminated tissue is consumed in the food chain. This also means that mercury can occur well below the detection limit in surface water samples and even in the sediment, while fish tissue can be contaminated through bioaccumulation to a level that is hazardous for human consumption or for wildlife that prey on these fish.

Low Dissolved Oxygen, High pH and Nutrients – Varying combinations of these factors occur in many of Arizona's shallow, constructed lakes. Low

dissolved oxygen and high pH stress aquatic organisms and can contribute to fish kills. A high density of submerged and emergent aquatic vegetation can restrict recreational activities. In addition, algal blooms which can result from increased nutrients use a substantial amount of oxygen in the water at night when photosynthesis cannot take place. Significant decreases of dissolved oxygen can also result in fish kills.

Turbidity and Suspended Sediment Concentration (SSC) – Arizona repealed its turbidity standard in 2002 and adopted a suspended sediment concentration (SSC) standard to protect Aquatic and Wildlife designated uses. Turbidity is a qualitative measure of water clarity or opacity, while suspended sediment concentration is a quantitative measure of suspended solids. They represent two different ways to measure fine suspended particles such as clay, silt, organic and inorganic matter, plankton, and other microscopic organisms.

Arizona's turbidity standard was derived from criteria established in more humid states that do not share its unique arid conditions, relatively low plant coverage, and erodible soils. These factors make some degree of suspended solids a natural phenomenon in Arizona; however, there are numerous other human-induced causes that have raised suspended sediment loads to an unhealthy level in some of Arizona's lakes and streams. Excessive suspended solids may be associated with aquatic habitat degradation such as reduced light penetration, temperature changes, excessive bottom deposits, and algal blooms.

ADEQ encountered several obstacles in assessing the new SSC standard for this report, which were described in more detail in Chapter III under "Turbidity and the New SSC Standard." The major difficulty was that SSC must be assessed under "base flow" conditions only, and ADEQ has not yet determined a scientifically based method for determining base flow. Until a method of assessing SSC data is developed, ADEQ has taken steps to ensure that evidence of potential suspended sediment problems is not lost. Any waters impaired based on the former turbidity standard have been placed in a subcategory (4D) of "not attaining" waters. Any waters with potential exceedances of the new SSC standard have been assessed as inconclusive. All have been placed on ADEQ's Planning List and are shown in Figure 33 on the next page. These lakes and streams are a high priority for further suspended solids studies.

Space for Figure 33. Waters Potentially Impaired due to Suspended Sediment (map and table)

What are the major sources of these pollutants?

The probable sources of pollutants impairing water quality in Arizona are reported in **Tables 36 and 37** and compared in **Figures 34 and 35** below. More than one source may be impacting a given stream reach or lake. It is important to note that for most streams and lakes, only a potential, unconfirmed source can be identified based on best available information, knowledge of land uses and activities, and geology of the watershed. Documented source identification is limited to locations where special investigations, such as a TMDL analysis, have been conducted.

Table 36. Probable Sources of Stream Pollutants – 2004

	Impaired or Not Attaining (miles)
Natural Sources	619.8
Agriculture	
Grazing	303.1
Historic pesticides	98.9
Crop production	48.8
Mining	252.8
Storm water runoff	98.9
Recreation	98.5
Outside Arizona	75.5
Roads	71
Septic systems	26.1
Waste disposal	15.5
Hydrologic modification	10.1
Point source	6

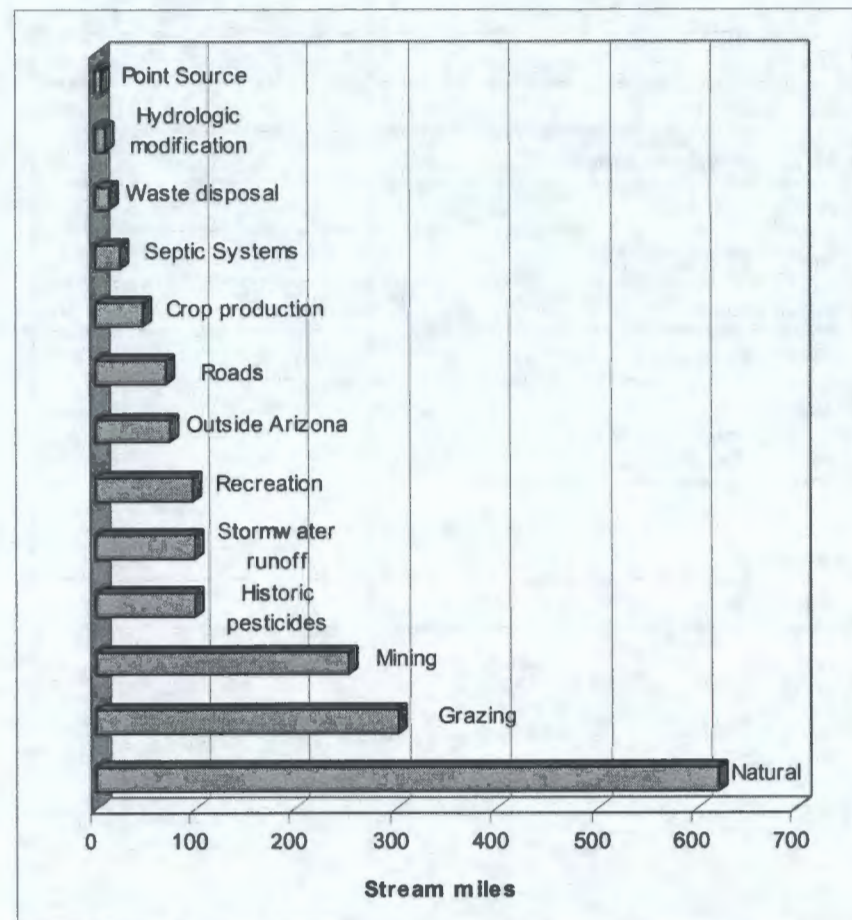


Figure 34. Probable Sources of Pollutants in Streams – 2004

Table 37. Probable Sources of Lake Pollutants – 2004

	Impaired or Not Attaining (acres)
Wildfire	18,350
Natural	2,683
Atmospheric deposition	1,790
Mining	1,464
Nutrient cycling	1,139
Septic systems	457
Design/Maintenance	350
Agriculture	
Historic pesticides	285
Grazing	120
Recreation	42
Urban Area	42
Point Source	15

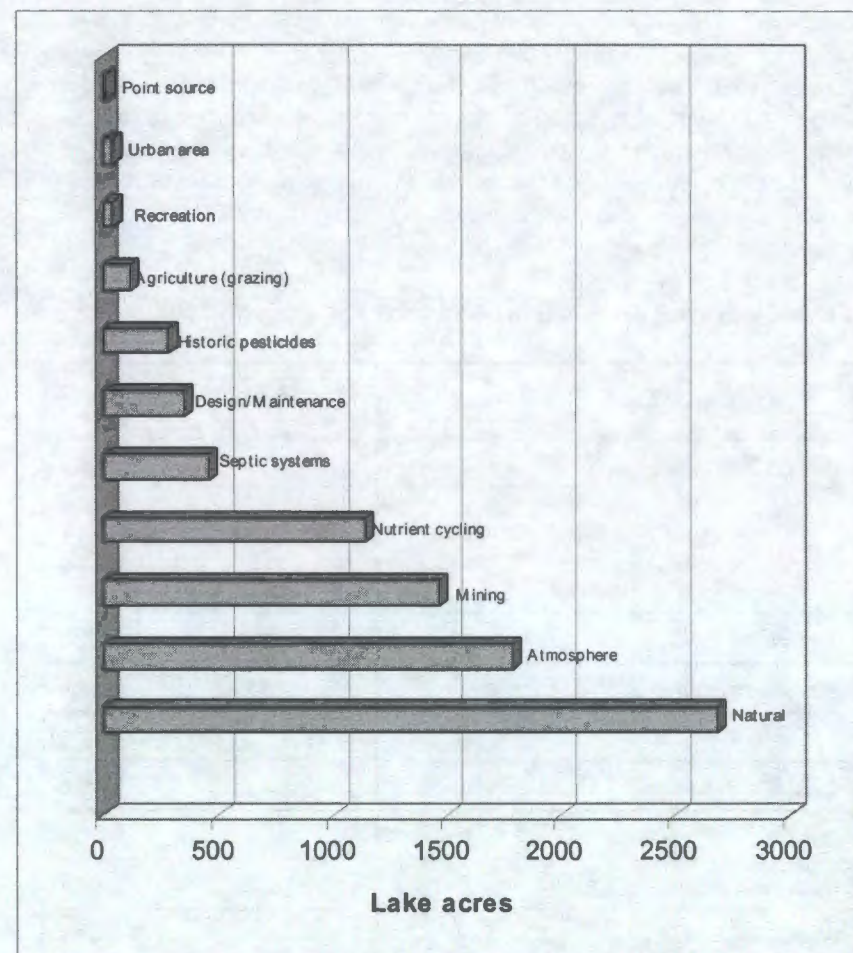


Figure 35. Probable Sources of Pollutants in Lakes – 2004*

* Wildfires have been excluded from this table. Wildfire is identified as a source in only one assessed lake - Roosevelt Lake. Due to the large size of this lake (18,350 acres), it has been excluded so that the graph can be scaled appropriately.

Natural Contributions -- Pollution is defined in the Clean Water Act, section 502 as a manmade or human-induced alteration of the chemical, physical, biological, and radiological integrity of water. Therefore, high levels of a pollutant which occur solely due to natural conditions are not a violation of Arizona's surface water quality standards because of a "natural background" exemption in the standards. However, natural sources do make some relative contribution to most impaired waters. For example, copper is a naturally occurring substance in Arizona, but mining can disturb the earth and release unnaturally high amounts of copper into streams. Arizona's soils are highly erodible and have the potential to contribute suspended sediment easily, but grazing can add even more sediment to a stream. In addition, sunny and arid conditions can lead to excessive algal productivity and eutrophic lake conditions such as low dissolved oxygen and high pH, but poor lake design or maintenance can do the same.

It is indeed clear from the graph on the previous page that natural sources make up a large portion of the pollutants impairing Arizona's streams and lakes. It is important to keep in mind, however, that this is a relative contribution which can be very small or very large. The graph should not be interpreted to mean that most of Arizona's impairments are natural. Determining the relative contribution of natural sources among other potential sources may require sophisticated analysis requiring large amounts of data. This level of detailed analysis is conducted for a TMDL, use attainability analysis, or to develop a site-specific standard.

Mining -- Resource extraction activities and the natural occurrence of ores are frequently the source of metals and low pH in Arizona's streams. Mining occurs in Arizona because metal ores are present.

Nutrient Cycling -- Although normal for a lake system, nutrient cycling may cause nutrient over-enrichment and hypereutrophic conditions, which can in turn result in low dissolved oxygen levels and fish kills. Nutrient cycling can be exacerbated by excessive nutrient loading from sources such as agriculture or septic systems.

Shallow Lake Design and Maintenance -- The construction and maintenance of a relatively shallow lake can result in negative impacts to the water chemistry or biological community. The physical characteristics of the lake (depth, volume, flushing rate) need to be in balance with natural rates of sediment transport and trophic conditions. When a lake or reservoir routinely exceeds narrative or

numeric standards, redesigning the lake or changing maintenance procedures may be necessary to alleviate the water quality problems.

Agriculture -- Agricultural sources can be broadly grouped into four areas of concern: crop production, grazing, concentrated animal feeding operations, and historic use of banned pesticides.

- Irrigated crop production is a probable source of pollutants such as turbidity, boron, selenium, nutrients, and pesticides. Crop production is concentrated around areas with adequate surface or ground water in Arizona, such as along the Colorado River, the Salt River, the Gila River, and the Verde River.
- Livestock and wildlife grazing are widely distributed throughout the state, occurring on lands owned or managed by federal agencies, Arizona State Land Department, privately owned lands and Indian reservations. Grazing activities may contribute pollutants such as bacteria, nutrients, and suspended sediments (measured as turbidity and SSC).
- Concentrated animal feeding operations (CAFOs) are scattered across the state. These livestock holding areas are a concern due to potential discharges of nutrients, bacteria, and suspended sediment to surface and ground waters.
- Historic use of banned pesticides still causes water quality problems today. Banned pesticides such as DDT take a long time to degrade and bioaccumulate in fish tissue, where they can be passed on to offspring and predators, including humans. It is also possible that these substances are still being used illegally.

Recreation -- The high concentration of people in many of the state's popular recreational areas can be a source of water quality impairment. Large numbers of motorized boats can spill a significant quantity of oil and gasoline into lakes. Off-road vehicles can erode sediment into streams. Human and pet waste not properly disposed of can contribute pathogens to the water. Even the feeding of wildlife, such as ducks on our urban lakes, can concentrate these animals in unnaturally high numbers around waterways. As a result, animal waste can reach very high levels in the water.

Urban Runoff -- The hard surfaces that cover our state's urban areas can contribute pollutants to Arizona's waters. Roads, sidewalks, and parking lots are impervious surfaces where water cannot permeate the ground. Urban runoff is

especially severe during storm events, which can quickly transport pollutants such as sediment from roads or fertilizer from yards into streams and lakes.

Hydrologic Modification – Stream channelization and dam construction are two examples of hydrologic modification in Arizona. These physical alterations can result in water quality problems such as increased sedimentation or excessive nutrient loading due to the removal of “buffer zones” around streams and lakes that would normally filter out pollutants.

A few words about point and nonpoint sources

Water pollution is often discussed in terms of “point” and “nonpoint” sources. Thirty years ago, federal and state regulations primarily governed point source discharges through NPDES permit requirements. Point sources come from a discrete discharge point or discharge pipe (e.g., wastewater treatment plant discharge). However, water pollution also comes from more diffuse sources that are referred to as nonpoint sources, such as runoff from fields, urban areas, or mining operations.

As indicated in Table 38, most pollution in Arizona’s surface waters is contributed by nonpoint or diffuse sources of pollution. This may indicate the effectiveness of the state and federal regulatory programs working with point source discharges and that control of nonpoint source contributions largely remains non-regulatory, based on education and funding mitigation projects.

Table 38. Point and Nonpoint Source Contribution to Impairment

	Streams, canals, and washes (miles)	Lakes and reservoirs (acres)
Point Sources	6	15
Nonpoint Sources	735	23,115

For example, in addressing nonpoint source contributions to an impaired surface water, the TMDL Program works with all interested parties to identify implementation strategies to mitigate the problem. Then ADEQ’s Nonpoint Source and Watershed Management Programs work with the local watershed work groups and federal agencies to identify funding sources to implement control strategies. Federal agencies such as the Forest Service and Bureau of Land Management, address nonpoint source pollution in their management

strategies by requiring the implementation of Best Management Practices.

Is the water safe to drink, swim in, and fish from?

Can We Drink the Water? – The quality of water delivered by public water systems is strictly regulated and monitored to ensure that federal and state standards established to protect public health are met. Drinking water advisories are issued by the supplier when monitoring confirms that a drinking water standard has been exceeded. If water is supplied by a public water system, information about the quality can be obtained by contacting the supplier and requesting a consumer confidence report, or by contacting ADEQ's Drinking Water Program at 1-800-771-5677 extension 4624.

When water is supplied by a private water system (i.e., a system serving less than 15 connections and 25 people), it is the user's responsibility to test and protect the quality of their drinking water. General water quality information and ways to protect drinking water sources can be obtained by contacting a county health department. Ground water quality information about wells monitored in an area can also be obtained from EPA's STORET database through the internet at: <http://www.epa.gov/STORET>

Is It Safe to Swim in the Water? – Frequently visited swimming areas are monitored for *Escherichia coli* at Slide Rock State Park, Lake Havasu, Lake Powell, and the Salt River Recreation Area. Beaches have been closed when verification sampling results exceed water quality standards and remain closed until standards are met. ADEQ is unaware of routine monitoring at other swimming and water-skiing areas. Past bacteria monitoring suggests swimming should be avoided in storm water runoff and if the water has become stagnant. Waters classified as "effluent dependent waters" and many urban lakes are also not designated for swimming or wading uses.

Mohave County monitors beaches regularly in Lake Havasu during the summer. Extensive studies and mitigation actions were conducted in Thompson Bay in the 1990's.

The Bureau of Reclamation in cooperation with the National Park Service monitors beaches once a week during the summer in Lake Powell. Lake Powell beach closures have occurred only in Utah.

The US Forest Service monitored the Salt River Recreation Area during the summers of 2002 and 2003 under ADEQ's Water Quality Improvement Grant Program. Monitoring data show nominal bacterial levels, with no confirmed

exceedance which would cause a swimming closure. ADEQ awarded the Water Quality Improvement Grant to improve sanitary conditions in this heavily used recreation area.

Of the monitored swimming areas, only Slide Rock State Park closed for swimming during the assessment period. A bacteria Total Maximum Daily Load (TMDL) analysis has been completed on Oak Creek at Slide Rock State Park to estimate contributing loads from sources within this sub-watershed and to develop alternatives to mitigate these impacts to water quality. The following Slide Rock swimming closures occurred during the assessment period:

1998 - 7 closures, occurring June through September
1999 - 10 closures, occurring July through September
2000 - 20 closures, occurring May through September
2001 - 16 closures, occurring June through September
2002 - 3 closures, occurring July through August

Should We Eat the Fish? – Some chemical pollutants concentrate in fish and shellfish by accumulating in fatty tissues or selectively binding to muscle tissue. Some of these pollutants cannot be detected in the water column nor in bottom sediments, but bioaccumulate in aquatic life. This bioaccumulation may pose a threat to human health if these organisms are eaten on a regular basis in excess of federal fish consumption advisory guidelines.

Fish consumption advisories are issued to inform the public about possible adverse health effects and contain recommendations for how many fish meals can safely be consumed. Advisories may be directed at a particular subset of the population because some people are at greater risk (e.g., sport or subsistence fishers, pregnant women and children).

In Arizona, fish consumption advisories are currently in effect in 15 areas (**Table 39 next page**). Additional information about fish tissue screening and fish advisories can be obtained by contacting ADEQ at (602) 771-4536 or Arizona Game and Fish Department at (602) 789-3260.

Table 39. Fish Consumption Advisories – 1998-present

Waterbody Name Size	Pollutant and Sources	Advisory and Date
Painted Rocks Reservoir, Painted Rock Borrow Pit Lake, and portions of the Gila, Salt, and Hassayampa rivers – 380 acres and 140 miles	DDT metabolites, toxaphene, dieldrin, and chlordane pesticide pollutants due to historic use of these banned pesticides.	Since 1991 – Do not consume fish and other aquatic organisms.
Dysart Drain (canal drains to Agua Fria River in the Phoenix metro area) – 3 miles	DDT metabolites contamination caused by historic use of this pesticide.	Since 1995 – Do not consume fish and other aquatic organisms.
Arivaca Lake – 120 acres	Mercury contamination. Potential sources include mine tailings, atmospheric deposition, and naturally mineralized soils.*	Since 1996 – Do not consume fish and other aquatic organisms.
Pena Blanca Lake – 50 acres	Mercury contamination caused by historic mining and natural conditions at the lake.*	Since 1995 – Do not consume fish and other aquatic organisms.
Upper and Lower Lake Mary – 1625 acres combined	Mercury contamination. Sources to be investigated.	Since May 2002 – Do not consume walleye fish and limit consumption of other fish to one 8-ounce fillet per month.
Parker Canyon Lake – 129 acres	Mercury contamination. Sources to be investigated.	Since October 2002 – Women pregnant, women who may become pregnant, nursing mothers, children under age of 16: No consumption Women not in above categories: Consult health care provider Adult men (16 yrs. or older): Three 8 ounce (uncooked weight) fish meals per month

9 calls w/ ↑ Hg

Lyman Lake – 1500 acres	Mercury contamination. Sources to be investigated	Since October 2002 – Children under the age of 6: No consumption Women of childbearing age and children under the age of 16: One 8 ounce (uncooked weight) fish meal per month Women not in above categories: Consult health care provider Adult men (16 yrs. or older): Five 8 ounce (uncooked weight) fish meals per month
Soldier Lake – 28 acres	Mercury contamination. Sources to be investigated.	Since July 2003 – Do not consume fish.
Soldier Annex Lake – 122 acres	Mercury contamination. Sources to be investigated.	Since July 2003 – Do not consume fish.
Long Lake – 594 acres	Mercury contamination. Sources to be investigated.	Since July 2003 – Do not consume fish.

* Source identification and remediation actions have been developed through the Total Maximum Daily Load (TMDL) analysis process.

ADEQ is investigating opportunities to combine resources from multiple programs to determine the source, transport, and fate of historically used pesticides along the Gila River and its tributaries between Phoenix and Painted Rocks Lake. This study could be used to update the health risk assessment issued in 1991 by the Arizona Department of Health Services and to complete a TMDL analysis for these pesticides. (See Middle Gila Watershed – Volume II.)

National Mercury Fish Consumption Advisory – In January 2001, EPA issued a national advisory concerning risks associated with mercury in freshwater fish caught by friends and family for women who are pregnant or may become pregnant, nursing mothers, and young children. EPA is recommending that these most vulnerable groups limit fish consumption to one meal per week. That would be six ounces of cooked fish (eight ounces of uncooked fish) for an adult, and two ounces of cooked fish (three ounces uncooked) for a young child. US Food and Drug Administration has a companion advisory concerning the hazard posed by some fish purchased commercially (<http://www.cfsan.fda.gov>).

Nationally, mercury is thought to be introduced into water at higher than natural background levels due to air deposition. However, the main sources of mercury in Arizona include natural deposits and anthropogenic use of mercury. When mercury enters the water, biological processes transform it into the highly toxic form of methylmercury. Methylmercury accumulates in fish, with larger predatory fish generally accumulating higher levels of methylmercury. Methylmercury is a potent toxin, and babies of women who consume large amounts of fish when pregnant are at greater risk for changes in their nervous system that can affect their ability to learn.

Further Investigations – In cooperation with the Arizona Game and Fish Department, ADEQ has been investigating human health risks associated with eating fish caught in Arizona's lakes. Fish tissue samples have been collected and analyzed for mercury from the following lakes, which were chosen due to present or historic mining, the presence of predatory fish (e.g., largemouth bass, channel catfish, or northern pike), and recreational fishing activity:

- Bill Williams Watershed – Alamo Lake
- Colorado/Grand Canyon Watershed – Dogtown Reservoir
- Little Colorado-San Juan Watershed – Ashurst Lake, Fool's Hollow Lake, Lake Mary, Lyman Lake, Mormon Lake
- Middle Gila Watershed – Horsethief Basin Lake, Lynx Lake, Picacho Reservoir
- Santa Cruz-Rio Magdalena-Rio Sonoyta Watershed – Parker Canyon Lake
- Upper Gila Watershed – Dankworth Ponds, Roper Lake
- Verde Watershed – Goldwater Lake, Granite Basin Lake, Pecks Lake, Stoneman Lake, Watson Lake, Willow Creek Reservoir

Results from this monitoring led to the fish consumption advisory issued in May 2002 for Upper and Lower Lake Mary, Parker Canyon Lake and Lyman Lake. Recent monitoring in support of the Lake Mary TMDL has discovered mercury in Soldier Annex, Soldier Lake and Long Lake and also led to an advisory for all three of these lakes.

Why do Fish Kills or Abnormalities Occur? – Fish kills investigated by the Arizona Game and Fish Department and found to be due to a water quality concern are reported in **Table 40** on the next page. Most of these fish kills were associated with highly productive (eutrophic or hypereutrophic) lakes. Although lake eutrophication is a natural process, it can be accelerated by human activities

in the watershed or lake design. Fish kills caused by a reduction in water quantity (i.e., drought, dam releases) or because non-native game fish have been stocked in habitats that cannot support them, are not reported in **Table 40**.

Table 40. Reported Fish Kills and Abnormalities -- 1998-2002

Surface Water and Size	Pollutant and Sources	Dates
Little Colorado River-San Juan Watershed		
Black Canyon Lake 37 acres AZL15020010-0180	Ash, debris and sediment from the Rodeo-Chediski Fire washing into the lake following monsoon rains resulted in a complete fish kill.	July 2002
Cholla Lake 130 acres AZL15020008-0320	Organic bottom sediments resuspended in the water column by the wind, caused low dissolved oxygen and a massive fish kill	July 2002
Middle Gila Watershed		
Canyon Creek 6 miles AZ15060103-014	Ash washing down the creek following the Rodeo-Chediski Fire killed all fish as well as all other aquatic life. Note that the damage was observed to extend farther downstream into tribal land.	July 2002
Cortez Park Lake 2 acres AZL15060106B-0410	Herbicide applications resulted in a massive die-off of aquatic vegetation. Associated low dissolved oxygen then killed approximately 2600 fish.	June 1999
Grand Canal 5 miles AZ15070102 - 250	Fish kill consisting entirely of carp occurred between 99 th and 107 th Avenues. Probable cause was dumping of unknown substance into canal.	2001
Salt River, below 91 st Ave. WWTP 5 miles AZ15060106B-001D	Inadequate treatment (lack of aeration and denitrophication) due to a power outage, resulted in an extensive fish kill in the Gila River and part of Buckeye Canal.	October 2000
Salt Watershed		
Crescent Lake 100 acres AZL15060101-0420	AGFD reports that due to productivity (<u>algal blooms</u>), winter and summer fish kills have occurred on a very regular basis. The most recent was in 1998.	Winter 1998
Lake Sierra Blanca 30 acres AZL15060101-1390	<u>Aquatic weed growth</u> and subsequent <u>high pH</u> resulted in the death of approximately 100 rainbow trout.	June 1998

Santa Cruz-Rio Magdalena-Rio Sonoyta		
Arivaca Lake 120 acres AZL15050304-008	<u>Algal bloom</u> die off and resulting low dissolved oxygen killed 4000-5000 fish over a 4-day period in 1999. A smaller fish kill in 2000 was related to a storm inflow of water that suspended organic sediment loading in the lake and caused low dissolved oxygen.	June 1999 July 2000
Upper Gila Watershed		
Luna Lake 120 acres AZL15040004-0840	Algal bloom die-off, high pH, and low dissolved oxygen resulted in several hundred fish dying over a 16-day period.	July 1999
Verde Watershed		
Watson Lake 150 acres AZL15060202-1590	A blue-green algae bloom and high pH (9.5 - 9.8) associated with a fish kill. The algae is normally associated with lakes with high pH and elevated nutrients. It can produce a toxin that can kill fish.	July 2000
Whitehorse Lake 40 acres AZL15060202-1630	Low dissolved oxygen due to algal bloom die off, killed approximately 4000 fish. The majority of the dead fish were non-native black crappie young of the year.	July 1999

VII. Ground Water Quality: Out of Sight Not Out of Mind

How Does ADEQ Characterize Ground Water?

Ambient Ground Water Monitoring Program – ADEQ's Ambient Ground Water Monitoring Program has multiple objectives for its monitoring program. These monitoring objectives include:

- ▶ Fulfill legislative mandates to monitor aquifers to detect the presence of new and existing pollutants, determine compliance with applicable water quality standards, determine the effectiveness of implemented Best Management Practices, evaluate the effects of pollutants on public health or the environment, and determine water quality trends;
- ▶ Characterize regional ground water quality;
- ▶ Determine impacts from specific anthropogenic (human caused) sources.

Ground water sampling is conducted by ground water basin to examine regional ground water quality. There are 51 ground water basins recognized by the Arizona Department of Water Resources. Since 1995, ADEQ has completed 10 ground water basin studies, has ongoing studies in 13 more basins, and intends to start three more basins this year (Figure 41). Data collected by this program are provided to the well owner and incorporated into ADEQ's Water Quality Database. A comprehensive report and a summary fact sheet are published for each basin studied. These can be obtained and downloaded from ADEQ's internet site at: www.adeq.state.az.us. These studies are also reflected in the ground water quality monitoring maps provided in this report. Note that the wells sampled are not evenly distributed across the state. Areas where basin studies have been completed will have a much greater volume of data, whereas other areas may have little or no data at this time.

Selection of basins for investigation are based on a number of factors, including watershed rotation schedule (see Chapter VIII) and development pressures in the basin that may be impacting ground water quality. Systematic, grid-based random sampling is conducted to investigate potential nonpoint source pollution impacts on ground water quality. Higher density sampling occurs around targeted land uses to determine their affect on ground water quality.

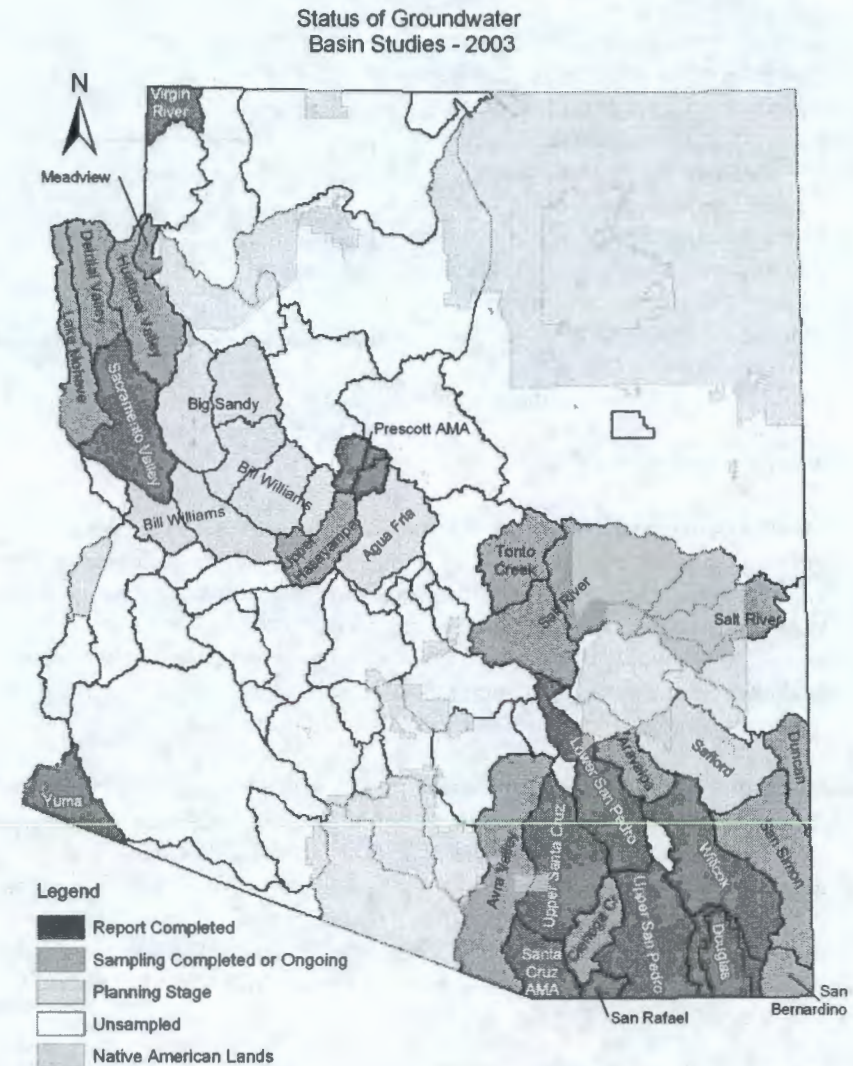


Figure 41. Ground Water Basin Studies

Basin studies are sometimes conducted in collaboration with other internal and external monitoring programs. The internal programs include the Pesticide Contamination Prevention Program, the Border Program (Mexico border), and the Aquifer Protection Permit Program. The U.S. Geological Survey has been ADEQ's external partner.

Inorganic constituents (see list in text box) are collected at each site, while samples for Volatile Organic Compounds (VOCs), pesticides on Arizona's Ground water Protection List or banned pesticides, radionuclides, bacteria, perchlorate, and other constituents were collected in areas where these parameters are likely to be encountered. Samples for oxygen, hydrogen and nitrogen isotope analysis are collected at certain sites, to assess aquifer recharge characteristics. Based on the ground water sampling results and statistical analysis, index wells are selected which will be re-sampled in the future to determine ground water quality change over time.

Inorganic Chemicals Tested

Antimony	Beryllium	Cyanide	Nitrate
Asbestos	Cadmium	Fluoride	Nitrite
Arsenic	Chromium	Lead	Selenium
Barium	Copper	Mercury	Thallium

The Ambient Ground Water Monitoring Program provides important information to the public, including an overview of the ground water quality within a basin, areas where specific ground water quality problems can be expected to occur, and whether there has been any change over time in the ground water quality of the basin. This program is particularly important in evaluating effectiveness of nonpoint source pollution control by its broad, regional approach to monitoring and assessment of water quality.

Pesticide Contamination Prevention Program - This state mandated program is intended to prevent contamination of ground water, soil, and the vadose zone from pesticides used in agriculture. The Ground Water Protection List, established in 1992, includes a list of 152 pesticide active ingredients that have the potential to pollute groundwater in Arizona. Another 37 pesticides are on the list of banned pesticides (e.g, DDT, chlordane, lindane). However, only 22 of the 189 pesticides listed or banned have an Aquifer Water Quality Standard (see text box).

Pesticides with Aquifer Water Quality Standards

Alachor	Chlordane	2,4-D	Endothall	Glyphosate	Lindane	Picloram
Atrazine	Dalapon	Dinoseb	Endrin	Heptachlor	Methoxychlor	Simazine
Carbofuran	DBCP	Diquat	EDB	Heptachlor epoxide	Oxamyl	Silvex
						Toxaphene

The monitoring objectives for the Pesticides Contamination Prevention Program are:

- Determine whether these pesticide active ingredients or their metabolites are present or absent in the soil, vadose zone, or ground water;
- Determine whether an Aquifer Water Quality Standard has been exceeded; and
- Determine if ground or surface water pollution is occurring or has the potential to occur (soil contamination is usually an indicator) from general usage of pesticides.

Monitoring is aimed at providing an early detection to prevent further contamination; therefore, banned pesticides are not normally included in the analyses. Any detection of pesticides results in a follow up investigation, and if an exceedance is validated through follow-up monitoring, enforcement actions may be taken to mitigate the contamination. During the investigation, strict quality control samples (splits, duplicates and field spikes) are collected and tested.

Monitoring results are compared to water quality standards and Arizona Department of Health Services' Human Health Based Guidance Levels for the Ingestion of Contaminants in Drinking Water and Soil and other standards. All data collected by this program are included in the 305(b) Report and the Annual Groundwater Quality Report to the Legislature. In addition, quarterly monitoring results are sent to the Arizona Department of Agriculture.

Wells monitored for pesticides during the past 10 years are shown on Figure 42. This map illustrates the following information about pesticides in Arizona:

- Pesticides were detected at levels higher than an Aquifer Water Quality Standard (stars on the map) in only one area. Dibromochloropropane

(DBCP) was confirmed in three wells associated with citrus crops in 1994 in the Avondale area.

- Of the 407 wells monitored, pesticides have been detected in 41 wells (10%) (triangles and stars on the map).
- In 9% of the wells (37 wells), pesticides were detected but no pesticide standards were exceeded at these wells (triangles on the map), usually because no standard has been established for the pesticide detected.

Monitoring efforts were refocused in 1998, to two areas (Maricopa and Yuma counties) based on the results of the previous 10 years of data collection. These areas have had intense agricultural activities, so they are sampled every other year with funding provided by EPA through the Department of Agriculture.

While the focus of the Pesticide Contamination Prevention Program has shifted to known areas of impact, through the ambient groundwater program, pesticide monitoring is still conducted in basin studies where land uses exist to suggest possible impacts.

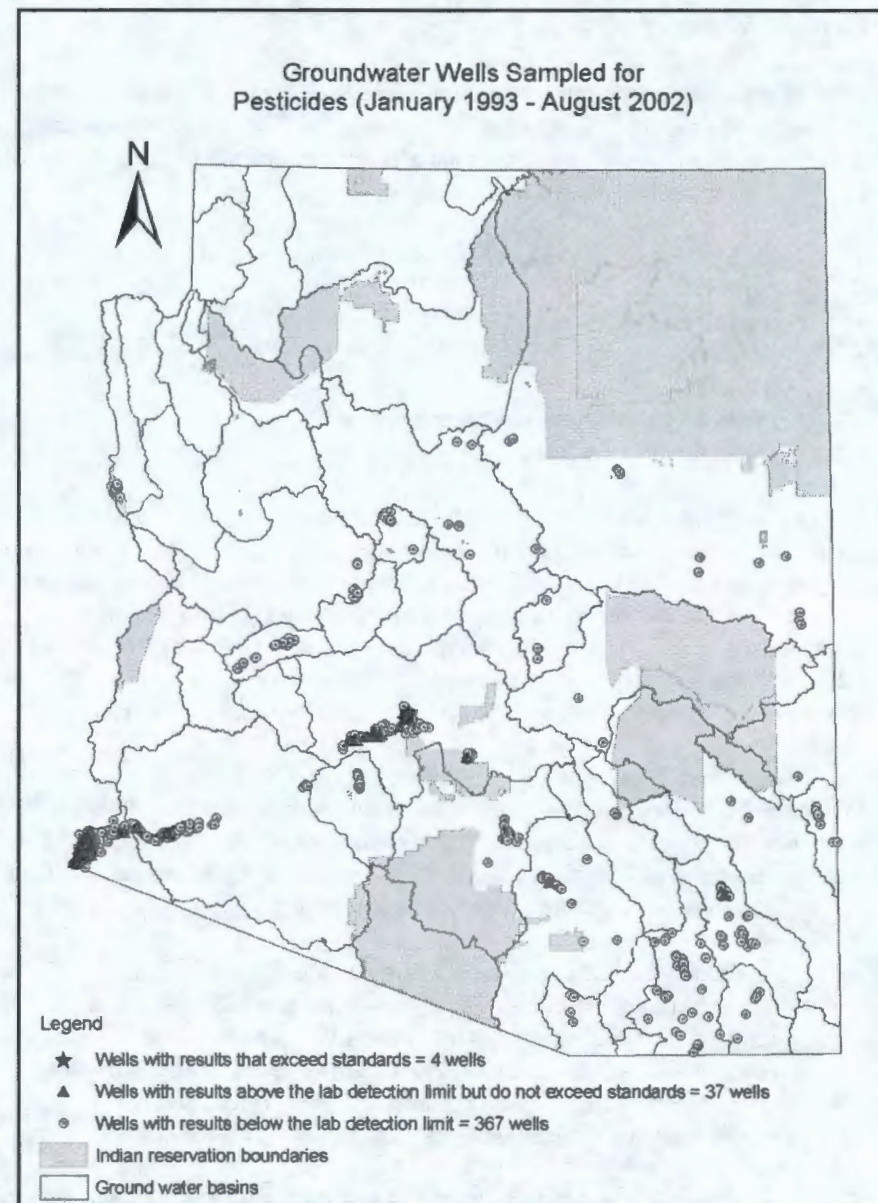


Figure 42. Wells Monitored for Pesticides

Ground water quality in Arizona.

Most of Arizona's ground water meets Aquifer Water Quality Standards, and thus is suitable for drinking water use. However, there are some ground water quality concerns in Arizona. To provide a general evaluation of ground water quality, this report looks at six constituents in the ground water:

- Pesticides (already discussed in the previous section)
- Arsenic
- Fluoride
- Hardness
- Nitrate
- Radiochemicals (gross alpha and uranium)
- Total dissolved solids (TDS)

Only three of these constituents indicate anthropogenic sources of pollution to ground water when they are elevated (pesticides, TDS, and nitrate). The others are generally found at levels that are natural for ground water. However, most of them (except pesticides and nitrate) are frequently elevated near mining sites where a lot of soil disturbance has occurred, especially where acids have been added to leach out metals. A discussion is provided for each constituent to explain any concerns that may result from elevated concentrations in ground water.

What the Maps Represent -- What these maps really represent is determined by what data are stored in the database and how the database query is made. What is included and what is excluded is equally important in reviewing the maps that follow. Here are the important criteria used for these maps:

- Only data in ADEQ's Water Quality Database were used in constructing these maps. The Database primarily contains data collected by ADEQ's Ambient Ground Water Monitoring Program and the Pesticides Contamination Prevention Program, with a little data from U.S. Geological Survey, the Salt River Project, and the Arizona Department of Water Resources.
- Although some data from Superfund cleanup sites has been entered into the database, this query excluded these data so as to not bias the results towards the areas known to be heavily contaminated. In other words, a disproportionate number of wells were sampled in these areas, so it

would appear that these contaminated wells make up a larger proportion of the state than they actually do.

- The data query was made for 10 years, from January 1, 1993 through December 31, 2002.
- All of the wells monitored for a specified constituent was shown.
- Only the data from the last time the well was monitored for that constituent was used.
- Since wells are sampled for varying constituents, the total number of wells sampled for each constituent varies.
- All results reported as "less than" the laboratory reporting level or "non-detection" were considered to be in compliance with Aquifer Water Quality Standards.

Ground Water Standards -- The Aquifer Water Quality Standards used in this assessment are shown in **Appendix C**. Generally these ground water standards are identical to the Safe Drinking Water Standards established for public water systems, as well as surface water standards for the Domestic Water Source designated use.

Arsenic – Arsenic is a trace element usually naturally occurring in Arizona's ground water. This constituent is of particular interest since EPA has lowered the health-based, drinking water standard associated with arsenic from 50 µg/L to 10 µg/L effective in 2006. Studies have linked long-term exposure to arsenic in drinking water to cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate. Non-cancer effects of ingesting arsenic include cardiovascular, pulmonary, immunological, neurological, and endocrine (e.g., diabetes) effects.

In general, arsenic can contaminate drinking water through natural processes, such as erosion of rocks and minerals. Arsenic can also contaminate drinking water when used for industrial purposes. Approximately 90 percent of industrial arsenic in the U.S. is currently used as a wood preservative, but arsenic is also used in paints, dyes, metals, drugs, soaps, and semi-conductors. Agricultural applications, mining, and smelting also contribute to arsenic releases in the environment. Arsenic is found at higher levels in underground sources of drinking water than in surface waters, such as lakes, reservoirs, and rivers.

Arsenic concentrations in wells sampled in Arizona between 1994 and 2002 is illustrated on **Figure 43**. The map shows that sampling activity was focused in ground water basins in the southeast and northwest parts of the state, with limited sampling in other parts of Arizona. The graphic reveals the following patterns related to arsenic:

- Generally, samples sites exceeding the present arsenic drinking water standard of 50 µg/L (stars on the map) are found in the Casa Grande area, along the San Simon River and Gila River in the southeastern Arizona, and in scattered areas of Maricopa County. Some exceedances are also present near the communities of Bullhead City, Prescott, and Willcox. Only 3% of wells sampled exceeded the present standard (50 µg/L)
- 15% of the wells sampled will exceed the new standard (10 µg/L) (triangles on the map).
- When the standard is 10 µg/L, the most numerous exceedances will occur in the same areas as occurred under the present arsenic standards; however, almost all areas of the state tested show some degree of arsenic exceedances over the new 10 µg/L standard (triangles on the map).

Arsenic water quality exceedances occur in many different types of aquifers and many types of geology; however, they are most commonly found in soft, sodium-dominated waters that are located in chemically closed hydrologic systems. Thus, some of the most common places for arsenic exceedances are confined or artesian aquifers found in southeastern Arizona.

In a recent publication, *Technologies and Costs for Removal of Arsenic from Drinking Water*, EPA 2000, EPA reviews the types of treatment systems that can be used to remove arsenic. These can be grouped into four broad categories: precipitation process, adsorption process, ion exchange process, and separation (membrane) process. This document and more information about arsenic can be downloaded from EPA's website at www.epa.gov/safewater/arsenic.

Groundwater Wells Sampled for Arsenic (July 1994 - March 2002)

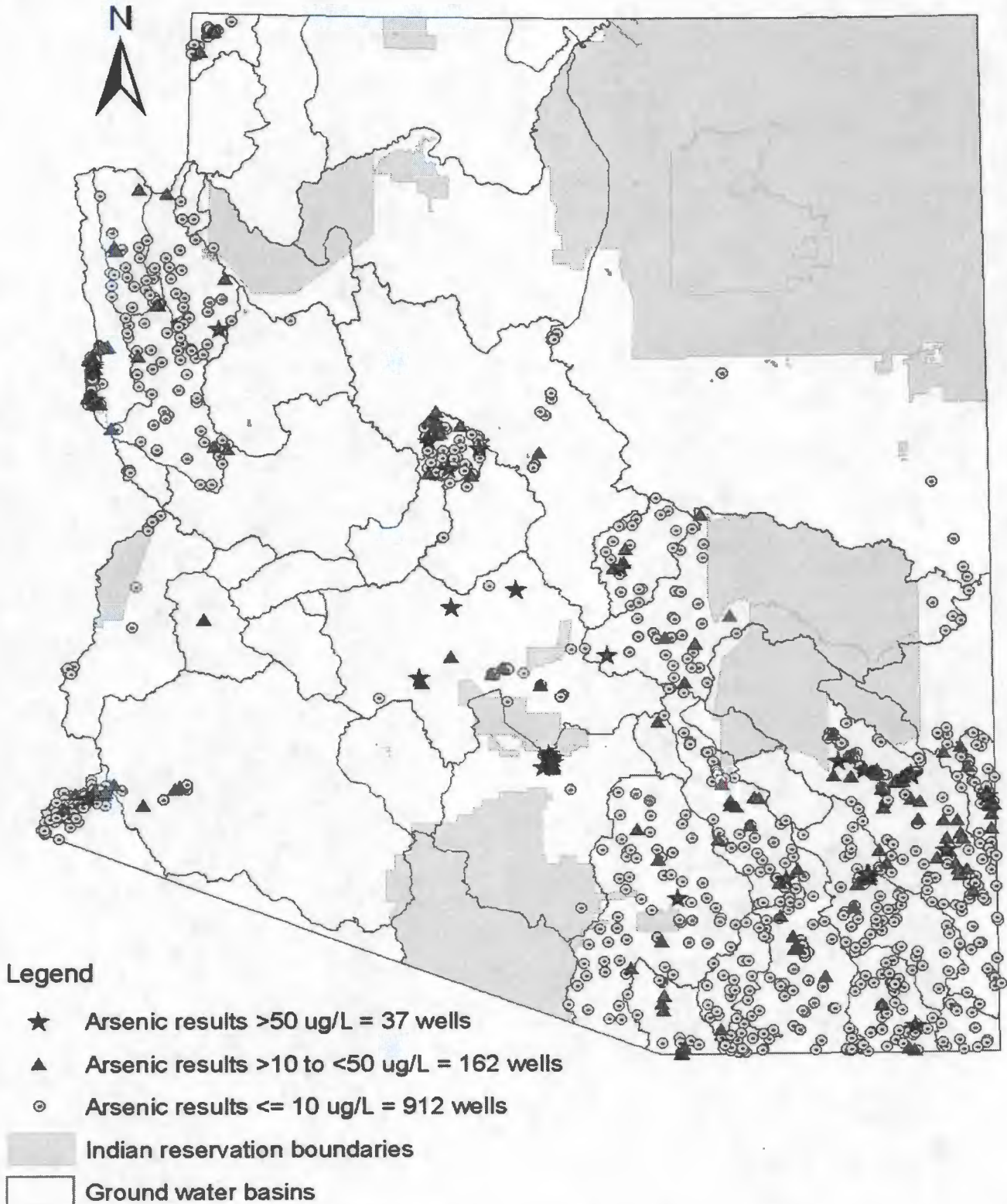


Figure 43. Arsenic Concentrations in Arizona Wells

Fluoride – Fluoride is another naturally occurring trace element in Arizona's ground water. Fluoride has both a health-based and an aesthetics-based water quality drinking standards associated. EPA has set a health-based water quality standard (or Primary Maximum Contaminant Level [MCL]) for drinking water at 4.0 mg/L. At concentrations higher than this standard, potential health effects include skeletal damage. The EPA has also set an aesthetic guideline (or Secondary MCL) at 2.0 mg/L, because higher levels may cause the mottling of teeth enamel.

Although fluoride at high levels is harmful, fluoride is essential for strong teeth and to prevent tooth decay; therefore, many municipal systems will add fluoride to the water (a process called fluoridation).

Fluoride levels in wells sampled between 1994 and 2002 is illustrated in **Figure 44**. The map reflects that sampling activity was focused in some ground water basins. This map indicates the following information about fluoride in Arizona:

- Fluoride monitoring was focused in ground water basins in the southeast and northwest parts of the state with limited sampling in other parts of Arizona.
- Approximately 4% of wells sampled by ADEQ exceeded the Primary MCL (4 mg/L) (stars on the map), while 17% of wells sampled exceeded the Secondary MCL water quality guideline (2 mg/L) (triangles on the map).
- Generally, the highest fluoride levels are found in southeastern Arizona in the San Simon, Safford, Duncan, Willcox and San Pedro basins.
- In other parts of Arizona, fluoride concentrations are predominantly below both health and aesthetics-based water quality standards though isolated exceedances of both standards occur in northwestern Arizona and along the lower Gila River.

Most of these elevated levels are associated with confined or artesian aquifers that have chemically closed hydrologic systems. Calcium is an important control of higher fluoride concentrations. In these aquifers, calcium is removed from solution which may result in high concentrations of dissolved fluoride if a source of fluoride ions is available. High fluoride levels found in shallow floodplain wells is often attributed to upward water leakage from confined

aquifers. Other sites in southeastern Arizona typically have fluoride concentrations below both health and aesthetics-based water quality standards.

Groundwater Wells Sampled for Fluoride (February 1994 - September 2002)

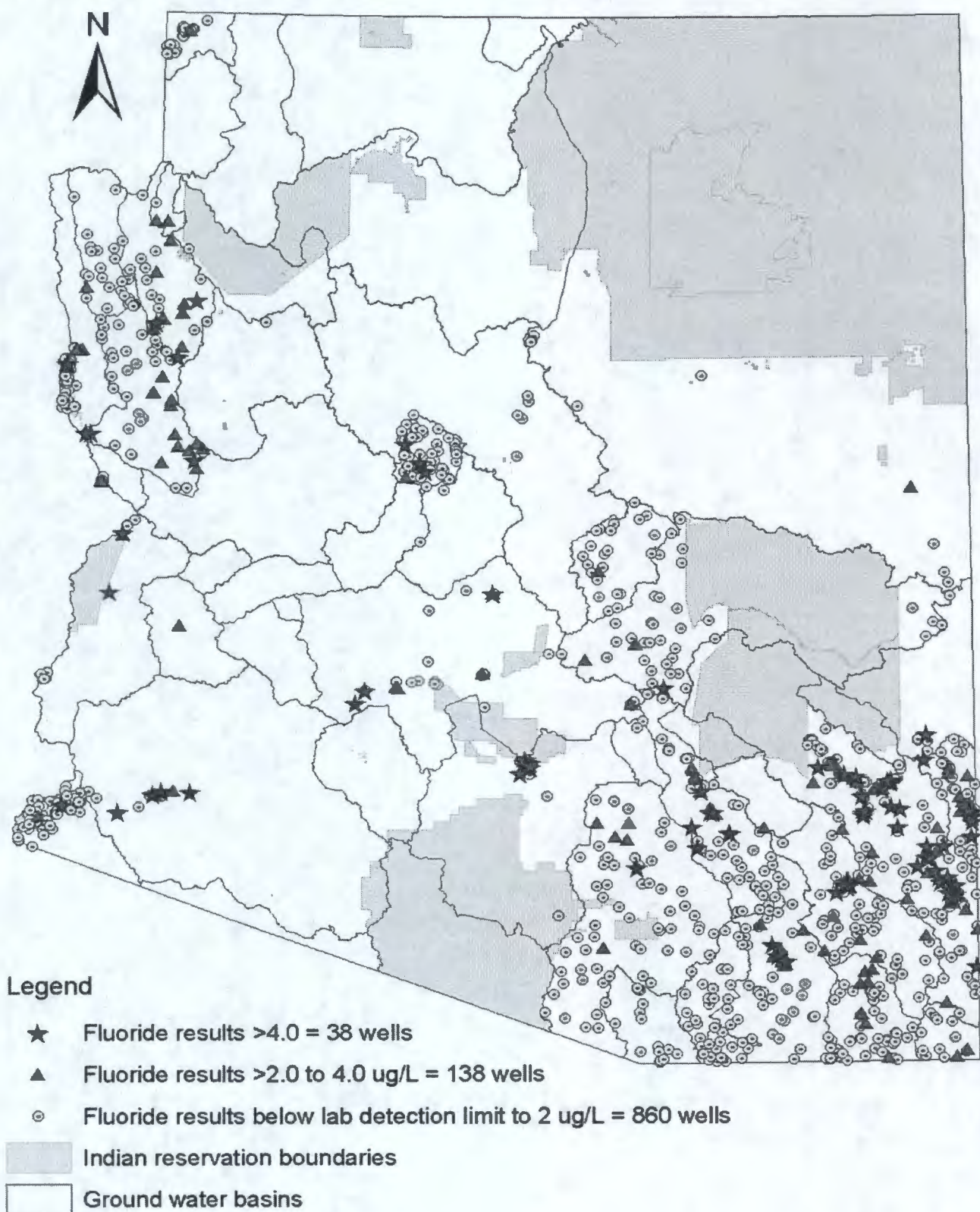


Figure 44. Fluoride Concentrations in Arizona's Wells

Hardness -- Hardness is an evaluation of certain chemical properties of water that originally represented the soap-consuming capacity of water. The term has now come to denote a more broad measure of the suitability of water for a number of domestic and industrial uses. Modern calculations of hardness usually report it as "calcium-carbonate hardness," which is a measure of the calcium and magnesium dissolved in the water. There are no health or aesthetic-based water quality standards for hardness.

Several hardness classifications exist, but the one most appropriate to Arizona waters is as follows:

- | | | |
|---|-----------------|-------------------|
| • | Soft | (below 75 mg/l) |
| • | Moderately hard | (75 to 150 mg/l) |
| • | Hard | (151 to 300 mg/l) |
| • | Very hard | (above 300 mg/l) |

"Soft" water, or water low in calcium and magnesium concentrations with sodium as the dominant cation, is desirable for the lack of scale it produces and for other aesthetic reasons. However, soft water has some potentially negative effects as well. For example, when used for irrigation, soft water can potentially create a sodium hazard in the soil which is damaging to the soil structure, especially when high levels of total dissolved solids (TDS) are present.

The softest water is typically found in very deep wells which produce water from confined or artesian aquifers. In contrast to hardrock aquifers, confined aquifers are often chemically closed hydrologic systems that favor the removal of calcium for sodium, producing the "soft" water. This type of soft water may also have elevated concentrations of trace elements such as fluoride and arsenic that may exceed health-based water quality standards.

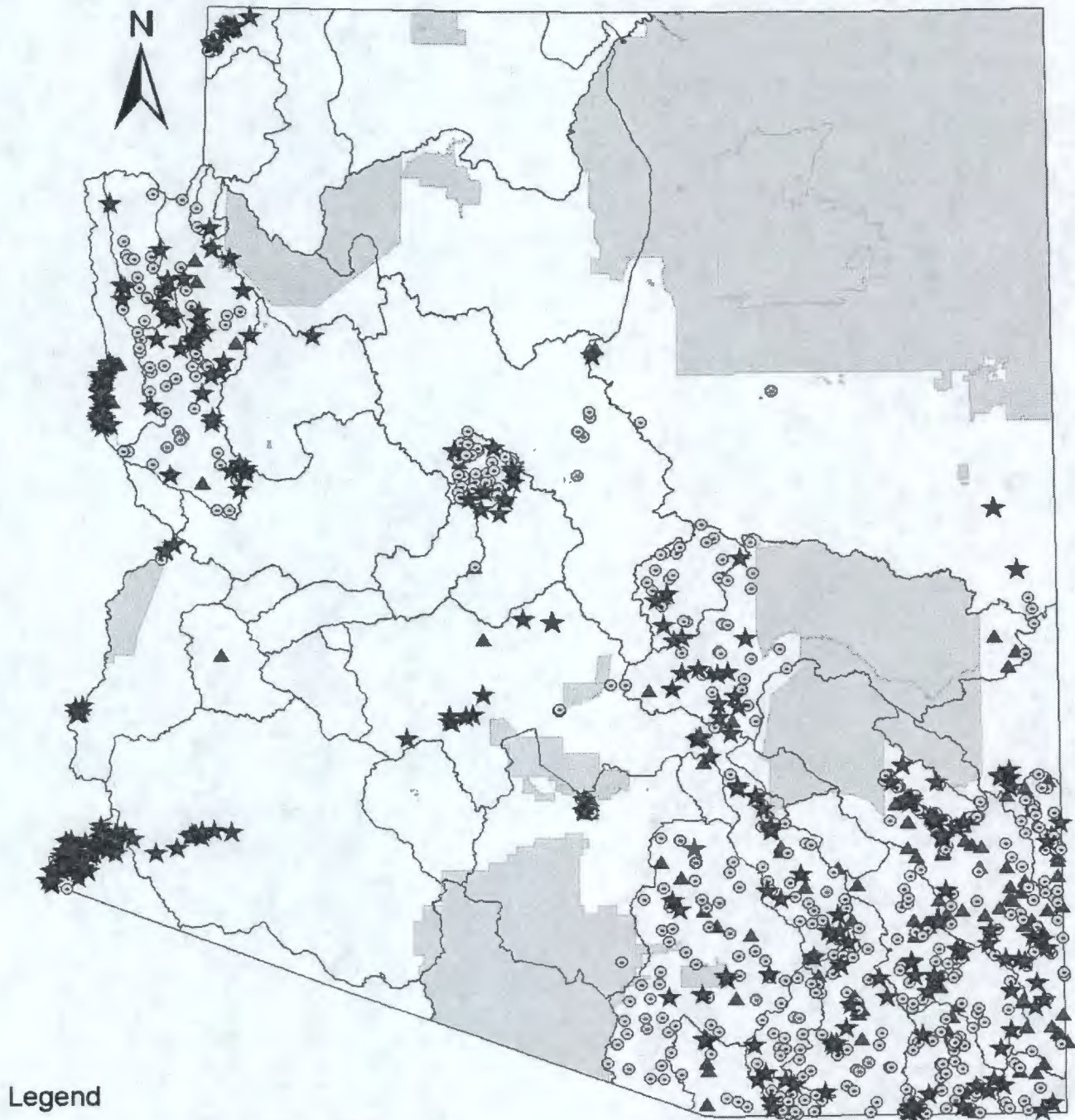
In basin studies within Arizona, hardness concentrations are often significantly higher at wells located in mountain hardrock as compared with wells located in valley alluvium. Wells in mountain hardrock may have higher hardness concentrations because recharge water has traveled considerable distances underground through weathered, mineralized zones that may create elevated concentrations of dissolved salts and minerals.

The map showing hardness levels of groundwater sites in Arizona between 1993 and 2002 (**Figure 45**) illustrates the following about hardness concentration in Arizona:

- Sampling activity was focused on groundwater basins in the southeast and northwest parts of the state with limited sampling in other parts of Arizona.
- "Very hard" water is most common hardness level. Of the 1,043 groundwater sample sites:
 - 35% had "very hard" water (stars on the map),
 - 31% had "hard" water (circles on the map),
 - 21% had "moderately hard" water (also circles on the map),
 - and
 - 13% had "soft" water (triangles on the map)
- "Very hard" water is particularly prevalent along the Virgin River near Littlefield, along the Gila River between Buckeye and Yuma, and the Colorado River between Bullhead City and Yuma. However, "very hard" water is found in many other areas throughout the state.
- In the northwest part of Arizona, in ground water basins around Kingman, ground water is generally "moderately hard" to "very hard." The Prescott Active Management Area shows a similar pattern.
- In southeastern Arizona, groundwater sites are more equally divided among the four groups: "very hard," "hard," "moderately hard," and "soft."

The map reflects that sampling activity was focused some of the ground water basins, with limited sampling in other parts of Arizona.

Groundwater Wells Sampled for Hardness (September 1993 - December 2002)



Legend

- ★ Hardness result >300 mg/L = 364 wells
- ⊙ Hardness result >75 to 300 mg/L = 545 wells
- ▲ Hardness result <= 75 mg/L = 134 wells

Indian reservation boundaries

Ground water basin

Figure 45. Hardness Concentrations in Arizona's Wells

Nitrate – In Arizona, nitrogen typically occurs as nitrate because of the oxidizing nature of most ground water. EPA has set a health-based water quality standard (or Primary MCL) for nitrate (as nitrogen) at 10 mg/L. Drinking water containing nitrate above 10 mg/L (as nitrogen) (may also be measured as 45 mg/L nitrate, as nitrate) should not be consumed by young children or nursing mothers because of possible methemoglobinemia, or "blue baby" health effects.

Nitrate (as nitrogen) concentrations may be divided into the following categories:

- Natural background (< 0.2 mg/L)
- May or may not indicate human influence (0.2 to 3.0 mg/l)
- May result from human activities (3.0 to 10 mg/l)
- Probably results from human activities (> 10 mg/l)

Occurrences of nitrate over 3 mg/L is frequently due to anthropogenic sources such as agricultural practices, septic systems, and other sewage disposal practices. However, some very deep wells in relatively pristine areas have been sampled that have nitrate concentrations over 3 mg/l that probably stem from natural soil organic matter. Thus, careful study must be undertaken before assigning a specific cause to elevated nitrate concentrations.

Figure 46 shows nitrate concentrations in wells sampled between 1994 and 2002. This map illustrates the following:

- Sampling was focused in ground water basins in the southeast and northwest parts of the state, with limited sampling in other parts of Arizona.
- Statewide, only 7% of wells sampled showed nitrate water quality standard exceedances (stars on the map).
- Generally, the highest nitrate concentrations tend to follow an arc starting in the Casa Grande area, through Buckeye, and finally through the lower Gila River area to Yuma. Fortunately, many of these elevated nitrate sites were sampled from shallow monitoring or irrigation wells that are not currently used for drinking water purposes.
- Other sites where nitrate exceeded health-based water quality standards are scattered around Arizona. Some of these can be attributed to shallow wells in other agricultural areas, monitoring wells in areas of

dense septic systems use, or isolated windmills situated next to corrals. Most of these nitrate-impacted wells have a shallow depth to groundwater. Deeper wells, however, are not immune to anthropomorphic sources, especially where poor well construction and inadequate seals become routes for pollutants to directly enter the ground water.

Groundwater Wells Sampled for Nitrate (July 1994 - October 2002)

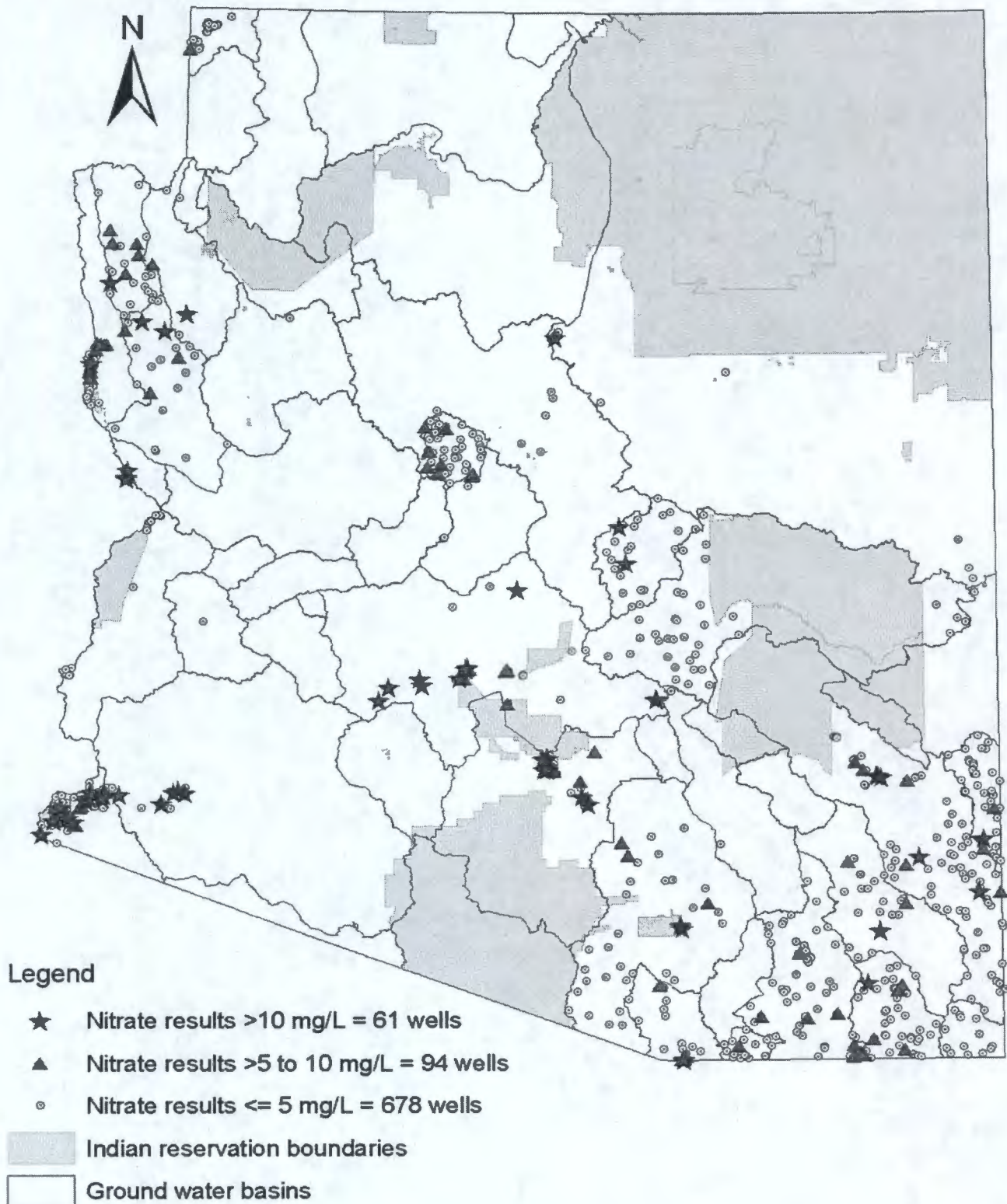


Figure 46. Nitrate Concentrations in Arizona Wells

Radiochemicals (Gross Alpha and Uranium) – Radioactive elements occur naturally in ground water across Arizona, though their concentrations can be dramatically altered by certain anthropomorphic activities such as hardrock mining. The most common radioactive parameters sampled by ADEQ include gross alpha and uranium. Each of these constituents has an associated health-based water quality standard, or Primary MCL. EPA has set a Primary MCL for gross alpha at 15 pCi/L and for uranium at 30 µg/L for drinking water. At concentrations higher than these standards, potential health effects include various types of cancer and kidney toxicity.

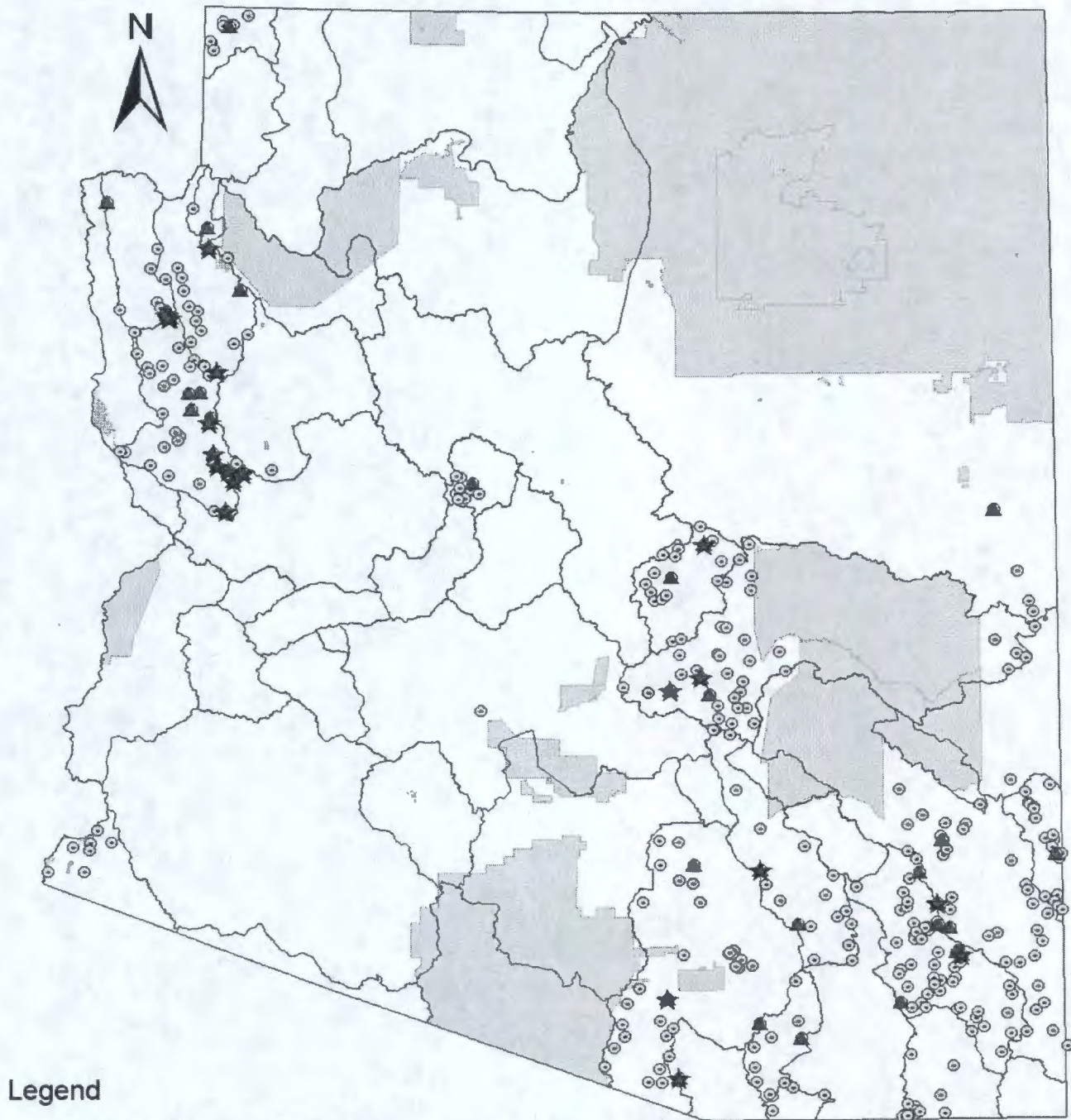
Figure 47 shows relative gross alpha and uranium concentrations in wells sampled between 1994 and 2002. This map illustrates the following information:

- Sampling activity was focused in some of the ground water basins, with limited sampling in other parts of Arizona.
- The map shows a much less dense number of radiochemical samples than other types of parameters. The likelihood of finding elevated radiochemicals, along with the cost of sample analyses, has focused the monitoring on a smaller number of wells within areas where radiochemical concentrations are suspected to be high. Radiochemical constituents are more likely to be elevated in mountainous, hardrock areas, particularly in granitic geology; therefore, samples are typically targeted in these areas of granite rock. Samples collected in areas of floodplain alluvium and/or basin-fill have only rarely shown the presence of elevated radiochemical constituents.
- With this semi-targeting of sites, where radiochemical samples are collected, 20% of the wells had exceedances of either gross alpha or uranium standards (stars and triangles on the map).
- Most of the uranium exceedances occur in the Kingman area of northwest Arizona, particularly in the granitic areas of the Cerbat and Hualapai Mountains. The highest concentrations are found near the old mining town of Chloride. In such mining areas, a significant amount of rock containing radioactive elements has been exposed.
- Sample sites in southeastern Arizona have shown occasionally elevated levels of both uranium and gross alpha. Again, most of these

exceedances are associated with granitic geology, with the highest levels typically around historic mining areas, such as the community of Dos Cabezas in the Dos Cabezas Mountains.

- Other areas of the state, such as along the Virgin River, in the Prescott AMA, and near Yuma show few, if any, radiochemical standard exceedances.

Groundwater Wells Sampled for Gross Alpha & Uranium (October 1994 - December 2002)



Legend

- ★ Both uranium >30ug/L & gross alpha >15pCi/L = 24 wells
- ▲ Gross alpha results >15 pCi/L = 47 wells
- Uranium results ≤30 ug/L=49 wells & gross alpha ≤ 15pCi/L = 286 wells

Indian reservation boundaries

Ground water basins

Figure 47. Gross Alpha and Uranium Concentrations in Arizona Wells

Total Dissolved Solids – Total dissolved solids, or TDS, is a measure of water salinity and is the sum of the cations and anions. Thus, this constituent is important because it provides a quick "snapshot" of an area's water quality. While there are no drinking water, health-based water quality standards associated with this constituent, there are both drinking water aesthetic-based water quality guidelines as well as guidelines for irrigation use.

The US Geological Survey classifies water according to the following scale:

- Fresh (below 1,000 mg/l)
- Slightly saline (1,000 to 3,000 mg/l)
- Moderately saline (3,000 to 10,000 mg/l)
- Very saline or briny (> 10,000 mg/l).

EPA has set an aesthetic guideline for drinking water (or Secondary Maximum Contaminant Level or SMCL) at 500 mg/l for TDS. The TDS levels in water at higher levels than the SCML may cause an unpleasant taste in drinking water.

For irrigation purposes, the Salt River Project's annual water quality report recognizes that salinity has effects on crop yield according to the following scale:

- No problems with crop yield (< 500 mg/l)
- Increasing problems with crop yield (500 to 2000 mg/l)
- Severe problems with crop yield (> 2000 mg/l).

TDS levels in wells sampled between 1993 and 2002 is shown in **Figure 48**. This map illustrates the following information about TDS concentrations in Arizona:

- Sampling was focused in some of the ground water basins, with limited sampling in other parts of Arizona.
- Of the 1072 ground water sites sampled by ADEQ:
 - 53% had TDS concentrations below the Secondary MCL standard of 500 mg/L (circles on the map),
 - 37% were between 500 and 2,000 mg/L (triangles on the map), and
 - 10% were greater than 2,000 mg/L (stars on the map).
- Generally, the highest TDS levels are associated with agricultural areas

along the Colorado, Gila, and Virgin rivers, as indicated by sampling near Buckeye, Fort Mohave, Littlefield, Safford, and Yuma (stars on the map).

- TDS levels in other parts of the state that were extensively sampled (such as southeastern Arizona, the Prescott AMA, and around Kingman) generally have levels below 2,000 mg/l, with the majority of sample sites below the 500 mg/l drinking water aesthetic guideline level.

Deterioration of ground water quality, as represented by increasing TDS levels, has been well documented in many studies. Salts present in the initial irrigation water applied become concentrated by evapotranspiration in the small amount of water that is recharged to the aquifer. These salt loadings on aquifers are exacerbated in river valleys, which typically have shallow ground water levels.

Groundwater Wells Sampled for TDS (June 1993 - December 2002)

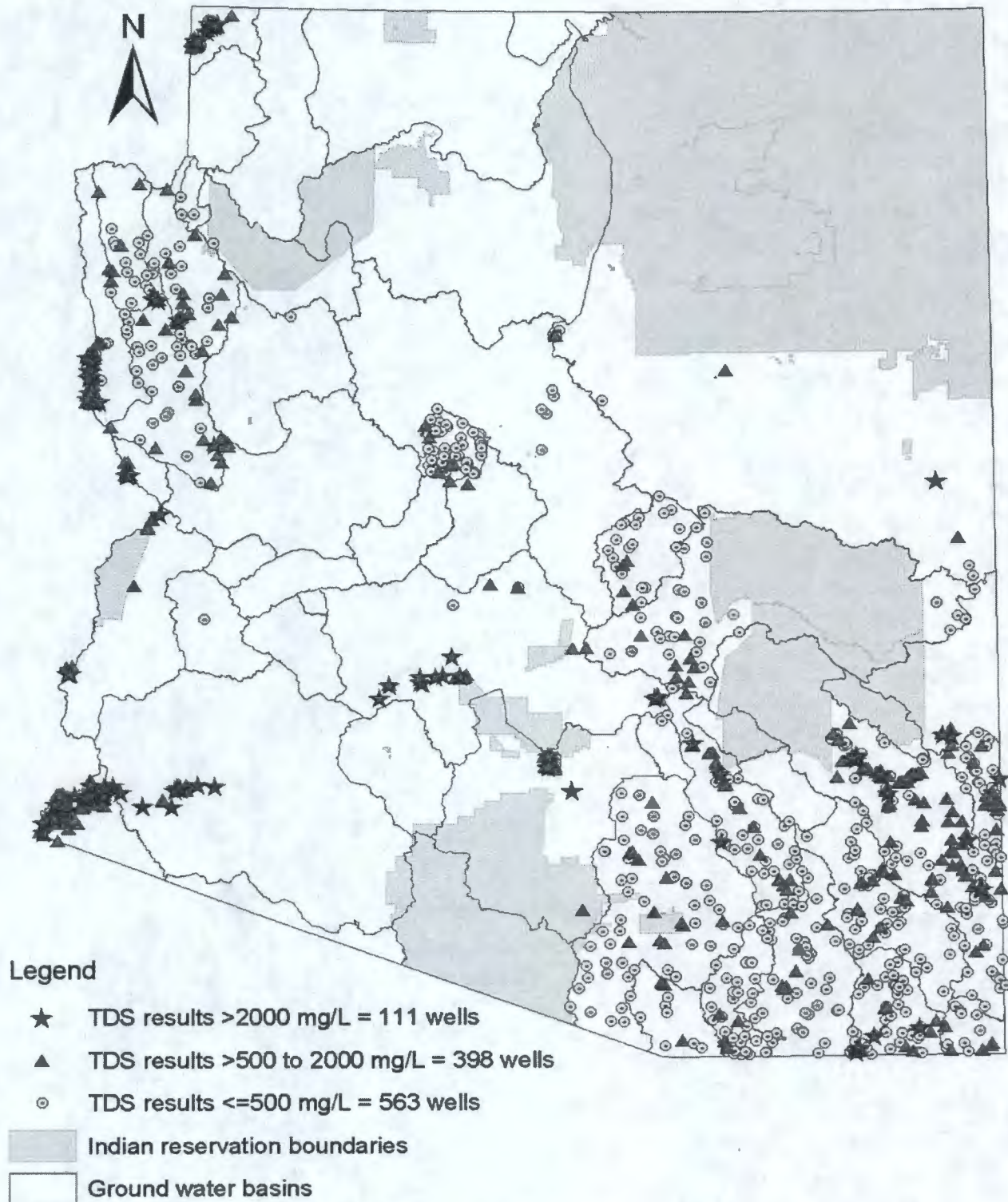


Figure 48. Total Dissolved Solids Concentrations in Arizona Wells

VIII. Taking Care of Water Quality Problems

Federal and state laws provide a framework for comprehensive water quality protection. Three federal and state regulations provide the foundation for protecting Arizona's water resources:

- **The federal Clean Water Act** – establishes a national goal to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. This act was amended in 1987 to include state nonpoint source management programs that address reduction of pollution associated with activities that do not have end-of-pipe discharge points and can have discharges that are dispersed over large areas (e.g., agriculture, urban runoff).
- **The federal Safe Drinking Water Act** – requires that states develop programs to protect surface and ground water used for public drinking water systems through source water protection programs, and to ensure the delivery of safe water to these public systems.
- **The Arizona Environmental Quality Act** – gives ADEQ authority to develop state environmental protection programs for both surface and ground water (e.g., Aquifer Protection Permits, drywell registration, Pesticide Contamination Program, installation and remediation of Underground Storage Tanks and ground water monitoring).

This section will discuss the following programs established to identify and mitigate surface water quality problems in Arizona:

- The Nonpoint Source Program,
- Surface Water Monitoring,
- The Total Maximum Daily Load Program,
- Watershed Management, including volunteer monitoring, and the Grants and Outreach Program.

Many other water quality protection programs (e.g., permits, compliance and enforcement), also protect and mitigate water quality problems. Information about these programs can be obtained at ADEQ's web site: www.adeq.state.az.us. The Ground Water Monitoring Program was discussed in Chapter VII.

The Nonpoint Source Program

Early Clean Water Act programs concentrated on controlling point sources of pollution caused by discharges from large municipal and industrial sources. These programs achieved tremendous improvements in both groundwater and surface water quality. Despite these accomplishments, much remains to be done to achieve the goals of the Clean Water Act and ensure that the nation's waters are "fishable" and "swimmable." In addition to point sources of pollution, Arizona's water resources continue to be impacted by nonpoint sources of pollution. Nonpoint source pollution is now considered the single largest cause of water pollution throughout the nation.

ADEQ works with federal, state, tribes, local agencies, nonprofit organizations, the environmental community and local citizens to develop nonpoint source watershed management strategies to reduce nonpoint source pollution that degrades water quality. These management strategies rely on the cooperation of stakeholders that live within the watershed or have management responsibilities for the lands and the surface and ground water resources within. Arizona's Nonpoint Source Program relies on this type of cooperation, education and partnership as the primary method to reduce nonpoint source pollution and improve the state's water quality.

Arizona's Nonpoint Source Program focuses on the following land use activities that have been shown to negatively impact surface and ground water within the state:

- ▶ Agriculture
- ▶ Forestry
- ▶ Urban runoff
- ▶ Hydromodification
- ▶ Onsite/septic waste treatment systems
- ▶ Mining
- ▶ Recreation

The Nonpoint Source Program aims to address water quality issues, educate the public to build a better understanding of the remaining water quality challenges and solutions, promote a public stewardship ethic and commitment, and

encourage public involvement and support for watershed protection programs. Arizona's Nonpoint Source Program integrates the state's Clean Water Act and Safe Drinking Water Act programs with voluntary incentives. ADEQ uses a combination of tools including: surface and ground water monitoring, watershed inventories, watershed characterizations, Total Maximum Daily Load (TMDL) studies, TMDL implementation plans, public drinking water system source water assessment plans, watershed-based plans, and water quality improvement projects to protect the state's water resources from nonpoint source pollution.

ADEQ's staff works closely with stakeholders to develop community-led, watershed-based planning efforts. These local planning efforts assist the Department in developing programs and outreach activities appropriate to the specific area and the issues. Since Arizona has a large amount of publicly owned lands, partnerships with federal, state and tribal land and resource management agencies are a key element in the program's success.

The other programs described in this chapter, along with the ambient Ground Water Monitoring Program described in Chapter VII, comprise the core of the Nonpoint Source Program administered in Arizona.

Surface Water Monitoring

ADEQ's field personnel obtain water quality data that is used to assess the biological, chemical, and physical integrity of Arizona's rivers, streams, lakes, and reservoirs.

The primary objectives of this program are to provide credible data to support the following:

- Ongoing monitoring of the waters of the state as required by state law,
- Determine water quality trends at long-term sites,
- Characterize baseline water quality of surface waters located in selected watersheds according to the 5-year watershed monitoring schedule,
- Support surface water quality assessments, identify impaired surface waters, and the specific causes of impairment,
- Determine compliance with applicable surface water quality standards,
- Determine baseline water quality in the state's Unique Waters and to determine whether water quality is being adequately protected or is being degraded.
- Development of new water quality standards, especially for physical

and biological integrity. For example, establish and determine trends at regional biocriteria and habitat reference sites in support of bioassessments and to test indexes of biological integrity/

Fixed Station Network Monitoring – One core of the ambient water quality monitoring program is ADEQ's Fixed Station Network (FSN). This monitoring program's primary purpose is to characterize baseline water quality of perennial, wadeable streams and to provide data to determine long-term water quality trends. This program incorporates longer monitoring time frames (more than 20 years) and lower site densities than the Watershed Characterization Monitoring Program. ADEQ fixed sampling sites are sampled quarterly each year. Long-term fixed station sites have been established on wadeable, perennial streams in nine of the ten major watersheds in the state. USGS provides the fixed station sites in the 10th watershed -- the Colorado - Grand Canyon Watershed. (See USGS below.) Currently there are 28 ADEQ fixed station sites (**Figure 49**).

Analytical Suite

Analytes being tested will vary based on the monitoring purpose. The following suite of analytes are collected at ambient monitoring sites:

<u>Field data:</u>	Dissolved oxygen, pH, specific conductance, stream flow, turbidity, air temperature, water temperature, site characteristics, photographs. For lakes add redox, secchi depth, depth (not flow), and chlorophyll a.
<u>General chemistry</u>	Specific conductance, pH, calcium, magnesium, sodium potassium, chloride, sulfate, fluoride, turbidity, total dissolved solids, total suspended solids, hardness, carbonate, bicarbonate, alkalinity (total and phenolphthalein). For lakes add chlorophyll a and algae identification.
<u>Nutrients:</u>	Ammonia (as nitrogen), phosphorus (total as phosphorus), nitrate/nitrite (total as nitrogen), total Kjeldahl nitrogen.
<u>Metals:</u> (total and dissolved)	Antimony, arsenic, barium, beryllium, boron (total), cadmium, chromium, copper, lead, mercury, manganese (total), selenium, zinc.
<u>Bacteria:</u>	<i>Escherichia coli</i> .

In addition, suspended sediment concentration will be collected at all future ambient stream sites.

USGS Cooperative Fixed Station Network Monitoring -- For a number of years, ADEQ has participated in a joint funding agreement with the U.S. Geological Survey to operate the Cooperative Fixed Station Network monitoring program (USGS Co-op Program). The USGS conducts water quality monitoring at 16 USGS Co-op Program sites located on Arizona's larger rivers, which are of a size and annual flow that precludes ADEQ staff from the ability to monitor (Figure 49). USGS also maintains gage stations at these sites. Water quality data are collected quarterly at sites located on the Colorado River, Salt River, Gila River, Bill Williams River, and the Verde River.

Watershed Characterization Monitoring -- ADEQ has identified 10 major surface watersheds in Arizona. In 1998, ADEQ adopted a rotational watershed framework in which staff conducts water quality monitoring in wadeable, perennial streams located in two watersheds each year. All 10 watersheds are monitored over a 5-year cycle. The watershed schedule is shown in Table 41.

The purpose of this monitoring is to obtain basic water quality data on streams and lakes in each watershed. Along with the analytical samples collected (see analytical suite text box), annual bioassessments and habitat assessments are made each spring to assess the health of the aquatic communities in wadeable, perennial streams.

Table 41. Arizona's Watershed Schedule

WATERSHEDS	FOCUS YEARS 1999 - 2011												
	99	00	01	02	03	04	05	06	07	08	09	10	11
Bill Williams					X					X			
Colorado - Lower Gila					X						X		
Colorado - Grand Canyon						X*					X		
Little Colorado - San Juan			X					X					X
Middle Gila				X					X				
Salt				X					X				
San Pedro - Willcox Playa - Rio Yaqui		X					X					X	
Santa Cruz - Rio Magdalena - Rio Sonoyta			X					X					X
Upper Gila		X					X					X	
Verde	X					X				X			

Note: Staff conduct watershed monitoring on the state fiscal year calendar, which starts July 1st and ends June 30th of the following calendar year. For example, 2004 starts on July 1, 2003 and ends June 30, 2004. * Monitoring in the Colorado-Grand Canyon Watershed was deferred in 2004 due to budget constraints.

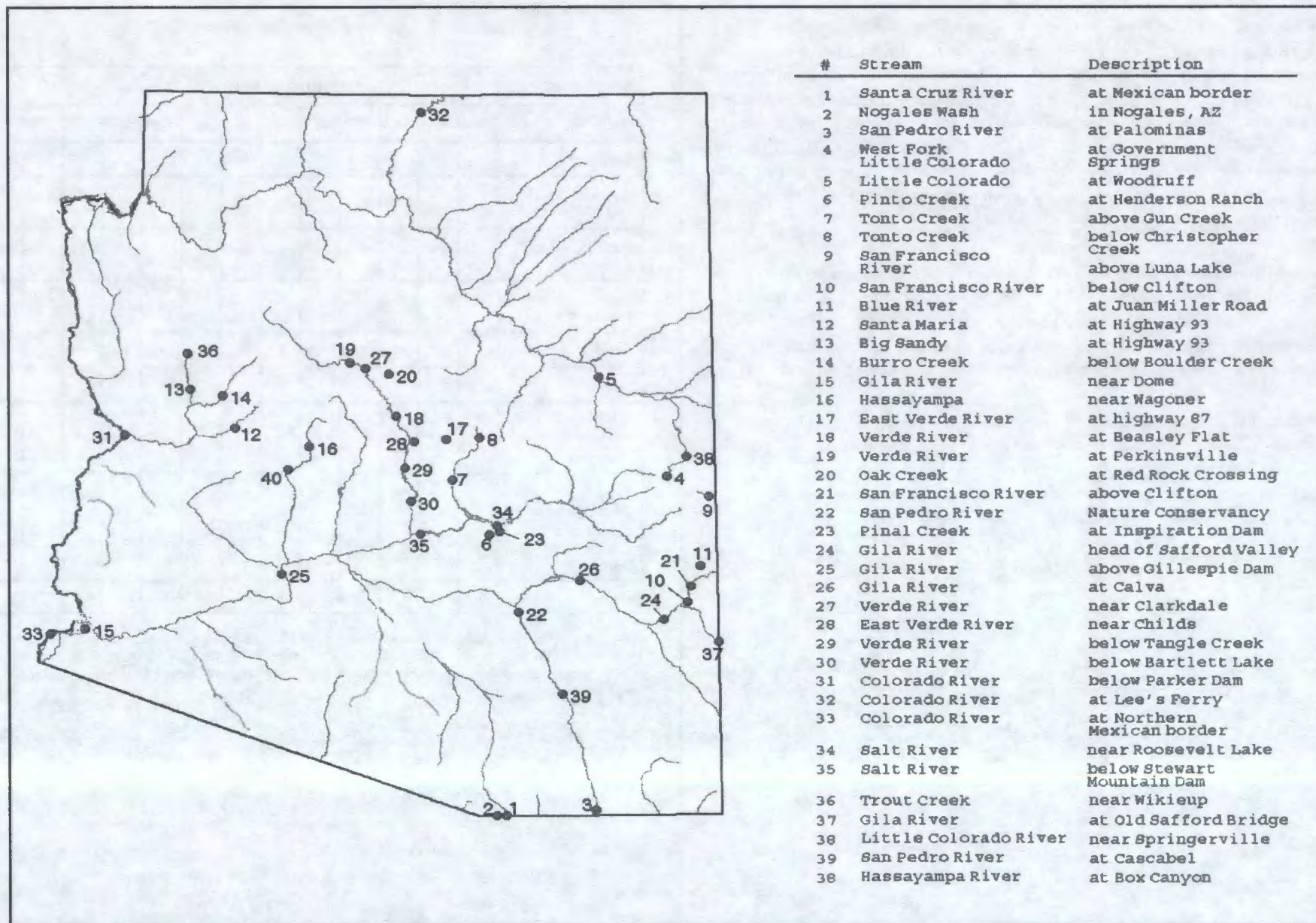


Figure 49. Fixed Long-term Monitoring Sites in Arizona - 2004

Unique Waters -- As resources allow, surface water quality data are collected on Arizona's outstanding state resource waters or "Unique waters" during the Watershed Characterization Monitoring. Currently, there are 18 Unique Waters in Arizona. The goal of this program is to acquire enough water quality data to determine water quality trends in these Unique Waters, and therefore, determine whether state antidegradation requirements are being met (i.e., is water quality improving, being maintained, or degrading).

Biocriteria Program -- Bioassessment data are being collected to support the development of Arizona's biocriteria program. ADEQ began research to develop a state biocriteria program in 1992, focusing on using macroinvertebrate communities to assess the biological health of the aquatic system. A warmwater and a coldwater Index of Biological Integrity have been developed for Arizona through this research. Currently, the Biocriteria Program monitoring effort is to test existing indexes of biological integrity for warm and cold water streams over a range of impaired conditions and sources of stressors.

Bioassessments and habitat assessments are conducted at biocriteria reference sites, ADEQ FSN sites, watershed sites, and unique water sites to develop Arizona's regional reference site network statewide and to monitor trends in reference conditions over time. The goal is to conduct bioassessments at a minimum of 10 biocriteria reference sites in each watershed each water year. Benthic macroinvertebrate samples in wadeable, perennial streams with suitable riffle habitats are collected during the spring index period (April, May, or June).

Lakes Program -- Data and information on lake and reservoir water quality are collected by a team of field staff to identify water quality problems and determine potential sources of pollution. The overall monitoring objectives of the Lakes Program are to evaluate the water quality status of lakes and reservoirs by identifying natural and human-induced conditions affecting lake water quality and to develop feasible ways to maintain, protect, and restore lake water quality. Biological (algae and chlorophyll), chemical, and physical limnology data are collected to characterize baseline water quality conditions.

The Lakes Program also follows the 5-year watershed monitoring schedule to organize its monitoring activities. Monitoring resources are focused on lakes and reservoirs located within the two major watersheds that are identified for study each water year. The Lakes Program monitoring activities incorporate four basic approaches:

- Baseline water quality monitoring and assessment,
- Targeted monitoring to fill assessment gaps identified on the Planning List,
- TMDL analyses to diagnose and recommend the most feasible ways to improve lake water quality, and
- A criteria development project to classify lakes, that will lead to class-specific water quality standards to protect the lake resources.

Targeted Monitoring From the Planning List - The Planning List that is generated during the assessment process identifies monitoring data gaps. Those waters with an overall ranking of high would be scheduled for monitoring in the two years following assessment report. Medium or low priority waters would be addressed in the subsequent three years, with the objective of having sufficient monitoring data on all waters on the Planning List within the current five-year watershed cycle. However, the current drought in Arizona may delay obtaining sufficient data during critical conditions on some waters on the Planning List.

Targeted monitoring focuses efforts on those surface waters that show the most potential for impairment. These intensive monitoring efforts are designed to ensure monitoring captures seasonality, spatial and temporal variations, and suspected critical loading conditions.

The factors used to prioritize TMDLs are similarly used for the Planning List, except that no designated uses have been assessed as "impaired." In addition to those factors identified in the TMDL Priority Ranking section (next page), Planning List prioritization considers:

- ▶ The number of exceedances compared to the number of samples taken, and the potential for completing the sample collection necessary to make an assessment;
- ▶ Whether there are critical conditions (season, precipitation, activity in the watershed) when exceedances occur, so that sample collection is scheduled when these conditions are represented;
- ▶ Watershed monitoring rotation, when listed due to insufficient data rather than exceedances;
- ▶ Development of comprehensive watershed management plans; and
- ▶ Whether the surface water has been on the 303(d) List in the past.

Total Maximum Daily Load (TMDL) Program

ADEQ's TMDL Program must develop Total Maximum Daily Loads for each surface water identified as impaired. TMDLs must be initiated for surface waters identified as "high priority" within the first two years following list approval by EPA. All other waters ranking medium or low priority are scheduled for TMDL development within the next two 5-year watershed cycle. However, the fact that Arizona is in the fifth year of a drought poses a significant obstacle to the completion of scheduled TMDLs. Some impaired waters may flow only during precipitation events, while others may have water quality problems which only appear during heavy storms.

A Total Maximum Daily Load Analysis (TMDL)

A TMDL is a written, quantitative plan and analysis to determine, on a pollutant specific basis, the maximum loading a surface water can assimilate and still attain and maintain a specific water quality standard during all conditions. The TMDL allocates the loading capacity of the surface water to point sources and nonpoint sources identified in the watershed, accounting for natural background and seasonal variation, with an allocation set aside as a margin of safety.

TMDL development leads to identification of a surface water load and waste load capacity for each pollutant. The final TMDL includes point source (waste load) allocations, nonpoint source (load) allocations, and load reductions necessary for attainment of water quality standards based on the critical conditions for loading. Records review, stakeholder interviews, field reconnaissance, field measurements, and modeling are performed to better understand the location, magnitude, and conditions causing the impairment. This process ultimately leads to an understanding of what needs to be done to reduce and prevent the impairment, and how long it might take the surface water to attain water quality standards.

The TMDL analysis starts with identification of the pollutants of concern and the water quality standards that must be attained to protect designated uses. Pollutant-specific numeric targets are set based on the most stringent water quality standard applicable to the surface water.

Source analysis then identifies the location and magnitude of point source and nonpoint source loadings. Point source waste loads are from discrete conveyances of discharge directly to a surface water (i.e. wastewater treatment plant outfall). Nonpoint source loads are from non-discrete discharges, including runoff generated by activities such as grazing, agriculture, mining and forestry. The TMDL also establishes the naturally occurring "background conditions" of the watershed, which are included in the nonpoint source load category.

A pollutant specific load capacity, which includes a margin of safety, is calculated based on flow characteristics and the numeric target (generally the applicable surface water quality standard). When the load capacity and sum of the sources' contributions during the critical condition are compared, load allocations and necessary load reductions can be determined.

Waste load reductions from point sources can be managed through permitting programs such as Arizona's Pollutant Discharge Elimination System (AZPDES). However, there are no regulatory programs for nonpoint pollution, so load reductions from these sources are strictly voluntary. In Arizona, most surface water impairment is a result of nonpoint source pollution. Nonpoint source pollution may include excessive sediment caused by the denudation of grasslands, the location of roads, construction, bacteria from wildlife and/or recreation, metals from historic mining practices and road cuts through ore bodies, and pesticides from historic agricultural practices.

Stakeholders are encouraged to participate throughout the TMDL process. For most impaired surface waters, achievement of water quality standards will occur through voluntary efforts such as participation in watershed management groups, volunteer monitoring, pursuit of funding for cleanup measures, and education.

Since the current 303(d) List was approved in 2002, XX TMDLs have been submitted to EPA for approval. The status of surface waters on Arizona's 2002 List is illustrated in Figure 50 on the next pages.

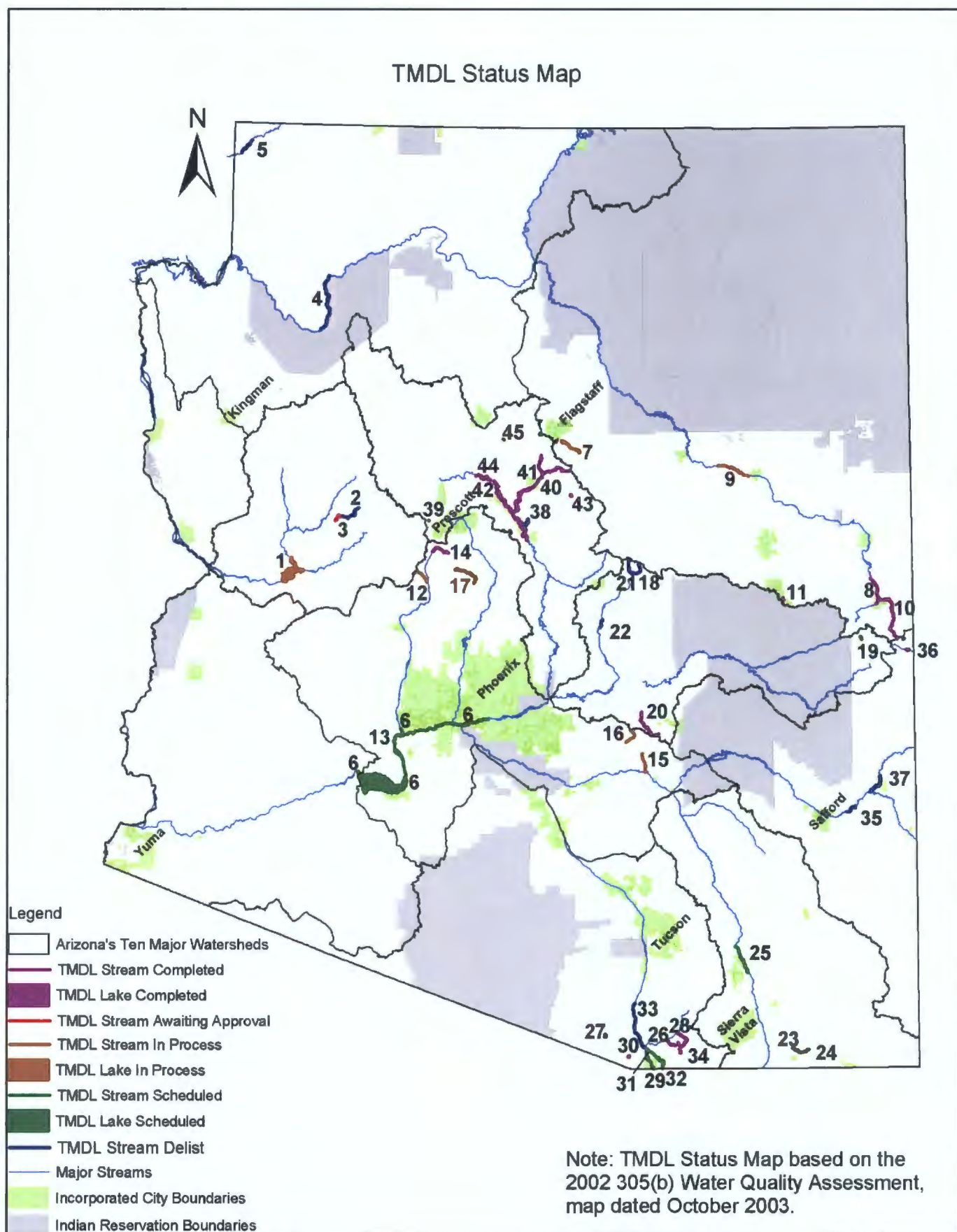


Figure 50. Status of TMDLs in Arizona

Status of TMDL Development from 1998 - 2003 (for Figure 50)

Map #	Surface Water Name Segment Description	Waterbody ID	Pollutants of Concern Causing Impairment	TMDL Status
Bill Williams Watershed				
1	Alamo Lake	AZL15030204-0040	Mercury in fish tissue, high pH, sulfide, dissolved oxygen	In process Delisting sulfide (change in standard) Delisting dissolved oxygen (attaining standards)
2	Boulder Creek headwaters - Wilder Creek	AZ15030202-006B	Fluoride	Delisting fluoride (change in standard)
3	Boulder Creek Wilder Creek - Copper Creek	AZ15030202-005A	Arsenic, copper, zinc	Awaiting EPA approval of TMDL
Colorado - Grand Canyon Watershed				
4	Colorado River Parashant - Diamond Creek	AZ15010002-003	Turbidity	Delisting turbidity (change in standard)
5	Virgin River Beaver Dam Wash - Big Bend Wash	AZ15010010-003	Turbidity, fecal coliform	Delisting turbidity and fecal coliform (changes in standards)
Colorado - Lower Gila Watershed				
6	Painted Rocks Borrow Pit Lake	AZL15070201-1010	DDT metabolites, toxaphene, chlordane, low dissolved oxygen, fecal coliform	Scheduled Delisting fecal coliform (change in standards)
Little Colorado - San Juan Watershed				
7	Lake Mary (upper) Lake Mary (lower)	AZL15020015-0900 AZL15020015-0890	Mercury in fish tissue	In process
8	Little Colorado River Water Canyon - Camero Wash	AZ15020001-009 AZ15020001-010	Turbidity	Complete
9	Little Colorado River Porter Tank - McDonalds Wash	AZ15020008-017	Copper, silver	In process
10	Nutriso Creek headwaters - Little Colorado River	AZ15020001-017 AZ15020001-015	Turbidity	Complete
11	Rainbow Lake	AZL15020005-1170	Nitrogen, phosphorus, pH	Complete
Middle Gila Watershed				
12	French Gulch headwaters - Hassayampa River	AZ15070103-239	Copper, manganese, zinc	In process Delisting manganese (change in standards)
6	Salt River, 23 rd Ave WWTP - Gila River	AZ15070101-015 AZ15070101-014 AZ15070101-010 AZ15070101-009 AZ15070101-008 AZ15070101-007 AZ15070101-005 AZ15070101-001 AZ15070103-001B AZL15070101-1020 AZ15060106B-001D	DDT metabolites, toxaphene, chlordane	Scheduled
13	Gila River Centennial Wash - Gillespie Dam	AZ15070101-008	(Also listed above) Boron	Scheduled
14	Hassayampa River headwaters - Copper Creek	AZ15070103-007	Cadmium, copper, zinc	Complete
15	Mineral Creek Devils Canyon - Gila River	AZ15050100-012B	Copper	In process
16	Queen Creek headwaters - Superior Mine WWTP	AZ15050100-014A	Copper	In process
17	Turkey Creek headwaters - Poland Creek	AZ15070102-036B	Cadmium, copper, zinc	In process

Map #	Surface Water Name Segment Description	Waterbody ID	Pollutants of Concern Causing Impairment	TMDL Status
Salt Watershed				
18	Christopher Creek headwaters - Tonto Creek	AZ15060105-353	Turbidity	Delisting turbidity (change in standards)
19	Crescent Lake	AZL15060101-0420	pH	Scheduled
20	Pinto Creek headwaters - Ripper Springs	AZ15060103-018	Copper	Completed. Phase II TMDL in process (shown as complete)
21	Tonto Creek headwaters - Haigler Creek	AZ15060105-013	Turbidity	Delisting turbidity (change in standards)
22	Tonto Creek Rye Creek - Gun Creek	AZ15060101-008	Turbidity	Delisting turbidity (change in standards)
San Pedro - Willcox Playa - Rio Yaqui Watershed				
23	Mule Gulch headwaters - Bisbee WWTP discharge	AZ15080301-090A	Copper, zinc, low pH.	Delisting all parameters (Reach resegmented due to hydrology and contamination sources, all exceedances occur downstream)
24	Mule Gulch Bisbee WWTP discharge - Whitewater Draw	AZ15080301-090B	Copper, low pH, zinc	In process
25	San Pedro River Dragoon Wash - Tres Alamos Wash	AZ15050202-002	Nitrate	Scheduled
Santa Cruz - Rio Magdalena - Rio Sonoyta Watershed				
26	Alum Gulch headwaters - ephemeral reach	AZ15050301-581A AZ15050301-581B	Cadmium, copper, zinc, pH.	Complete
27	Arivaca Lake	AZ15050304-0080	Mercury	Complete
28	Harshaw Creek headwaters - ephemeral reach	AZ15050301-025	Copper, zinc, low pH	Complete
29	Nogales and East Nogales Washes Mexico border - Potrero Creek	AZ15050301-011	Chlorine, turbidity, fecal coliform	Scheduled Delisting fecal coliform (change in standard)
30	Pena Blanca Lake	AZL15050301-1070	Mercury	Complete
31	Potrero Creek Interstate 19 - Santa Cruz River	AZ15050301-500B	Fecal coliform	Delisting fecal coliform (change in standard)
32	Santa Cruz River Mexico border - Nogales International WWTP discharge	AZ15050301-010	Escherichia coli, fecal coliform	Scheduled Delisting fecal coliform (change in standard)
33	Santa Cruz River Nogales International WWTP discharge - Josephine Canyon	AZ15050301-009	Fecal coliform	Delisting fecal coliform (change in standard)
33	Santa Cruz River Josephine Canyon - Tubac Bridge	AZ15050301-008A	Fecal coliform, turbidity. (Fish abnormalities documented by the US Fish and Wildlife Service may indicate a narrative toxic standard violation.)	Delisting fecal coliform and turbidity (changes in standards)
33	Santa Cruz River Tubac Bridge - Sopor Wash	AZ15050301-008B	Fecal coliform	Delisting fecal coliform (change in standard)
34	Three R Canyon headwaters - ephemeral segment	AZ15050301-558A AZ15050301-558B AZ15050301-558C	Cadmium, copper, zinc, pH.	Complete
Upper Gila Watershed				
35	Gila River Bonita Creek - Yuma Wash	AZ15040005-022	Turbidity	Delisting turbidity (change in standard)
36	Luna Lake	AZL15040004-0840	Dissolved oxygen, nitrogen, phosphorus, pH	Complete
37	San Francisco River Limestone Gulch - Gila River	AZ15040004-001	Turbidity	Delisting turbidity (change in standard)

Map #	Surface Water Name Segment Description	Waterbody ID	Pollutants of Concern Causing Impairment	TMDL Status
Verde Watershed				
38	Beaver Creek Dry Beaver-Verde River	AZ15060202-002	Turbidity	Delisting turbidity (change in standard)
39	Granite Basin Lake AZL15060202-0580	AZL15060202-0580	Dissolved oxygen	Scheduled
40	Munds Creek headwaters -Oak Creek	AZ15060202-415	Nitrogen, phosphorus	Complete
40	Oak Creek headwaters - Verde River	AZ15060202-019 AZ15060202-018A AZ15060202-018C AZ15060202-017 AZ15060202-018	Nitrogen, phosphorus	Complete
41	Oak Creek At Slide Rock State Park	AZ15060202-018B	<i>Escherichia coli</i> , fecal coliform	Complete
45	Oak Creek West Fork Oak Creek-Dry Creek	AZ15060202-018A, B, and C	Turbidity	Delisting turbidity (change in standard and designated use)
46	Pecks Lake	AZL15060202-1060	Dissolved oxygen, pH	Complete
47	Stoneman Lake	AZL15060202-1490	Dissolved oxygen, pH	Complete
48	Verde River unnamed tributary (15060202-065) - West Clear Creek	AZ15060202-037 AZ15060202-025 AZ15060202-015 AZ15060202-001 AZ15060203-027	Turbidity	Complete
49	Whitehorse Lake	AZL15060202-1630	Dissolved oxygen	In process

Note that the map and table:

- Report on TMDLs completed after 1998
- Do not reflect 2004 303(d) Listing being sent to EPA, except where noting delisting.
- Show status on the map as "delist" only if all parameters are to be removed from the 303(d) List, while table may indicate that a parameter is being removed while others are remaining.
- Show status on the map as "complete," although the table indicates a Phase II TMDL has been initiated.

Watershed Management

ADEQ focuses on six watershed management activities, which will be discussed in this section:

- Development of water quality watershed-based management plans and watershed characterization studies, currently through the Nonpoint Source Education for Municipal Officials (NEMO) Project;
- Development of TMDL implementation plans;
- Coordination with local watershed groups across Arizona who are actively developing and implementing watershed-based plans and TMDL implementation plans;
- Grants and outreach for available Water Quality Improvement Grants;
- Volunteer monitoring; and
- Regional 208 water quality planning.

Further information about these programs can be obtained at ADEQ's web site: <http://www.adeq.state.az.us>.

Watershed-based Management Plans and the NEMO Project -- Based on EPA guidance (*Supplemental Guidelines for the Award of Section 319 Nonpoint Source Grants to States and Territories in FY 2003*), watershed-based plans must include nine key elements. Where the watershed-based plan is designed to implement a TMDL, these elements will help provide reasonable assurance that the nonpoint source load allocations identified in the TMDL will be achieved. However, even if a TMDL has not yet been completed, EPA believes that these nine elements are critical to assure that public funds to address impaired waters are used effectively.

In broad terms, the elements that EPA requires for a watershed based plan are:

- | | |
|------------|------------------------------------|
| Element 1: | Causes and sources |
| Element 2: | Expected load reductions |
| Element 3: | Management measures |
| Element 4: | Technical and financial assistance |
| Element 5: | Information/education component |
| Element 6: | Schedule |
| Element 7: | Measurable milestones |

- | | |
|------------|--------------------------|
| Element 8: | Evaluation of progress |
| Element 9: | Effectiveness monitoring |

EPA funded a Nonpoint Source Education for Municipal Officials (NEMO) Project through the University of Arizona's Cooperative Extension Service. After experimenting with different ideas, University of Arizona and ADEQ agreed that this project would benefit Arizona most if the comprehensive characterization documents evolved into a watershed-based plans for the three target watersheds:

- Bill Williams Watershed,
- Verde Watershed, and
- Upper Gila Watershed.

The goals of this project are:

- Characterize the watershed (soils, slope, population, geology, etc.);
- Identify areas that are susceptible to water quality problems and pollution (point and nonpoint sources). The plans will not only identify 303(d) listed or non-attaining waters, but also identify those waters/areas that are vulnerable to degradation;
- Identify the sources that need to be controlled to protect or improve water quality.
- Identify the problem areas ADEQ and/or stakeholders should address through monitoring or project implementation. Identify pristine areas (i.e. unique waters or special areas of concern) that need to be protected.
- Identify management measures to be implemented to protect or improve/restore water quality. Where and why? Estimate costs of the potential management measures.
- Estimate the load reductions expected from the different management measures. Rank the management measures to demonstrate which measures are the most effective means for protecting or restoring water quality.

These watershed-based plans will include many of the same elements of a TMDL implementation plan but are written for a much larger area. The University of Arizona will also include implementation recommendations that will assist ADEQ in focusing on potential problems and problem areas.

Once the plans are complete, the University of Arizona Cooperative Extension Service will educate local land-use decision makers and other stakeholders. Having watershed-based plans written for three of Arizona's large watersheds will allow the Water Quality Improvement Grant Program to fund a wide variety of projects to control nonpoint source pollution.

This project will greatly increase the agency's knowledge of the watershed and help to more effectively fund water quality grant projects in Arizona. By characterizing and understanding the dynamics of each watershed, these watershed-based plans will also help ADEQ with their TMDL and monitoring efforts. Watershed characterizations will help the monitoring programs improve site selection and identify priority-planning sites.

TMDL Public Involvement and TMDL Implementation Plans -- ADEQ tries to proactively involve and educate the stakeholders affected by the TMDL process. The goal is to involve these stakeholders while the TMDL is being written, so that citizens are aware of the problems up-front and can realize their role in helping remedy the identified problems through development of a TMDL implementation plan.

After the load and wasteload allocations are established in the TMDL, corrective actions or changes in practices must be implemented in the watershed so that these allocations will be met in the future. TMDL Implementation Plans (TIPs) provide a strategy that explains how the allocations in the TMDL and any reductions in existing pollutant loadings will be achieved and the time frame in which compliance with applicable surface water quality standards is expected to be achieved. These plans may include a phased process with interim targets for load reductions.

Based on EPA guidance, each implementation plan includes the following components:

- A description of the Best Management Practices, or other management measures, and associated costs that must be implemented to achieve the load reductions estimated in the plan. An identification (using a map or a description) of the critical areas where those measures are needed.
- An estimate of the overall load reductions which the plan expects to achieve. An estimate of the load reductions expected for each of the

management measures or BMP (recognizing the natural variability and the difficulty in precisely predicting the performance of management measures over time). Costs should also be included.

- An action plan for implementing the management measures identified in the plan. This would include a schedule of interim, measurable milestones for determining whether the management measures or other control actions are being implemented effectively.
- A description of methods that will be used to evaluate the progress and effectiveness in achieving the plan goals.
- An information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing BMPs.
- An estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon, to implement the plan.

TMDL Implementation Plans use the information contained in the TMDL to develop a plan that encompasses the entire area causing known or potential pollution and contributing to the impairment. Scale varies depending on the causes and sources of contamination. Through active public involvement during the TMDL development, by the time the TMDL is completed, a TMDL Implementation Plan should also be written.

Development of these plans are to be community-led, when possible, and focus on encouraging volunteer groups to lead the way in implementing water quality improvement projects through the use of ADEQ's Water Quality Improvement Grant Program or other funding sources. The goal is to make sure that all of Arizona's waterbodies are clean and safe for uses such as swimming or fishing.

Watershed Groups -- How Can I Get Involved? — The importance of working with interested participants at the watershed level can not be overstated. All affected parties need to clearly understand the issues impacting water quality. To implement successful strategies improve water quality, these strategies will need to be tailored to the social and hydrological reality within each watershed or drainage area. Implementation of the best water quality improvements will be constrained by the legitimate resource limits.

Watersheds are a geographic areas with natural boundaries that do not correspond with political boundaries. City, county, state, and federal jurisdictions provide a maze of legal and political perspectives, as well as different and diverse management goals to work through. For any comprehensive watershed approach to have long term success, it will need to involve private and public landowners, numerous political jurisdictions and coalitions of special interest groups. Through federal, state, and local partnerships, we are achieving our goal of providing a cleaner, safer environment and ensuring its integrity for future generations.

A list of active watershed partnerships in Arizona is provided in **Table 42**. (The drainage areas the partnerships are involved in currently are illustrated on **Map XX -- not yet drafted**). These groups vary in their purpose and scope of concern as some groups were established primarily for oversight for a specific TMDL, while others have more long-standing concerns about water quality and water quantity in their watershed.

States, territories, and tribes are directed by EPA to collaboratively develop watershed-based plans. Watershed-based plans are effective and cost efficient ways to implement strategies, and restore the health of watersheds. The management strategies will rely on the cooperation of all people, and stakeholders that live within the watershed or have management responsibilities for the lands and the waterbodies within. ADEQ relies on this type of cooperation, education, and partnership as the primary method to reduce nonpoint source pollution and improve the state's water quality.

By involving local communities, tribes, and private-sector organizations, Arizona is focusing and prioritizing restoration activities to achieve demonstrable improvements in water resources, aquatic ecosystems and watershed health. More information is at: www.adeq.state.az.us/comm/download/water.

What Funds are Available to Implement Strategies? -- Numerous funding sources can be used for projects that improve water quality in Arizona. Three of those funds include:

- Water Quality Improvement Grants administered by ADEQ,
- Water Protection Funds administered by the Arizona Department of Water Resources, and
- Clean Water and Drinking Water Revolving Funds administered by the Water Infrastructure Finance Authority.

Water Quality Improvement Grants -- ADEQ distributes grant funds under Section 319(h) of the federal Clean Water Act to both public and private entities within Arizona. These grants are to implement on-the-ground water quality improvement projects that address nonpoint sources of pollution.

Grant applications that contain activities identified in a watershed-based plan (or equivalent plan) are given priority over other projects.

For a grant application to be considered eligible for evaluation, the application must comply with the process described in the current *Water Quality Improvement Grant Program Manual*, and the project description must indicate how all of the following will be accomplished:

- Improve, protect or maintain water quality in a waterbody in Arizona by addressing a nonpoint source of pollution;
- Demonstrate acceptable water quality management principles, sound design, and appropriate procedures;
- Yield benefits to the state at a level commensurate with project costs;
- Have an on-the-ground implementation component within Arizona;
- Provide for at least 40% of the project costs as non-federal match;
- Support the ADEQ, Water Quality Division Mission; and
- Be eligible under applicable state and federal regulations.

The Water Quality Improvement Grant Manual provides details about the grant program and includes the application forms. For more information about the Water Quality Improvement Grant Program or to be added to the mailing list, please contact the grant coordinator at (602) 771-4635 or, toll free in Arizona, (800) 234-5677, Ext. 771-4635, or email at: Rodine.Jean@ev.state.az.us or on the web site at: www.adeq.state.az.us/environ/water/mgmt/planning.

Table 42. Arizona Watershed Partnerships
(STILL DRAFTING THIS TABLE)

Name of Partnership	Primary Objectives	When and Where Meeting	Contact
Bill Williams Watershed			
Upper Bill Williams Partnership		3 rd Monday of the month Skull Valley Community Center	Alice Dixon, Allison@jakesrun.com
Boulder Creek?			
Colorado - Grand Canyon Watershed			
Northwest Arizona Watershed Council		3 rd Wednesday of the month Kingman	Eino Roundy (928) 757-2818
Arizona Strip Regional Planning Task Force		Every two months on Wednesday Fredonia	Arizona Alliance, Jim Matson jmatson@xpressweb.com or Jan Bundy, Box 231, Fredonia, AZ 86022
Colorado - Lower Gila Watershed			
Northwest Arizona Watershed Council		3 rd Wednesday of the month Kingman	Eino Roundy (928) 757-2818
Little Colorado - San Juan Watershed			
Little Colorado River Multi Objective Management Group (LCR MOM)		Every other 3 rd Wednesday, for 2 days Holbrook or Winslow	Jim Boles (928) 289-2422
Upper Little Colorado River Watershed Partnership		General membership and technical advisory group meetings on 3 rd Thursday of the month. Springerville	Bill Greenwood (928) 333-4223 or bgreenwood@eagar.com
Silver Creek Watershed Partnership		2 nd Monday of the month Holbrook	Tom Thomas, Town of Pinetop, 1360 North Niels Hansen, Lakeside Arizona 85929 (928) 368-8885
Billy Creek Watershed Partnership Show Low Creek Watershed Partnership	Combined forces with Silver Creek Watershed to develop a water budget (water quantity).		Pete Shumway or Tom Hieb. Tom Heib's phone (928) 524-4108
Middle Gila Watershed			
Upper Agua Fria Watershed Partnership		2 nd Tuesday of the month Arcosanti	Mary Hoadley (928) 623-7135 earthhous@aol.com
Salt Watershed			
Pinto Creek Watershed	Pinto Creek TMDL		
Northern Gila County Watershed Partnership (a.k.a. Mogollon Highlands)		1 st Thursday of the month Star Valley	

San Pedro - Willcox Playa - Rio Yaqui			
Campomoch-Sacaton Watershed Group		Quarterly meetings Willcox	Donna Matthews (520) 384-2229, ext 122 or donna.matthews@az.usda.gov
Mule Gulch???	Mule Gulch TMDL		
Upper San Pedro Partnership		2 nd Wednesday of the month Sierra Vista	George Michael (520) 378-4046
Middle San Pedro Partnership		Monthly, varies Benson	Run by Resource Conservation and Development agency
Lower San Pedro Partnership		Monthly, varies Cascabel	Run by Resource Conservation and Development agency
Santa Cruz - Rio Magdalena - Rio Sonoyta Watershed			
Friends of the Santa Cruz River		3 rd Thursday of the month Tubac	Ben Lomealee, President (520) 281-4904
Upper Gila Watershed			
Gila Watershed Partnership		2 nd Tuesday of the month Safford	Jan Holder (928) 428-5537, ext. 110 or watershedholder@yahoo.com
Eagle Creek Watershed Partnership		As needed on Saturdays	
Verde Watershed			
Oak Creek Canyon Task Force		2 nd Thursday of the month Sedona	Barry Allen (602) 953-1291
Verde Watershed Association		3 rd Tuesday of the month Prescott, Cottonwood, Camp Verde (varies)	Robert Hardy (928) 634-5526
Water Advisory Committee		3 rd Wednesday of the Month varies	John Munderlow (928) 771-3200
North Central Arizona Regional Watershed Consortium			Barbara Litrell, President (928) 649-0135 or blitrell@aol.com

Map of watershed partnerships

Water Protection Funds – In 1994, the Arizona Water Protection Fund was established to implement projects that would maintain, enhance, and restore rivers, streams, and associated riparian resources, including fish and wildlife that are dependent on these habitats. In previous years, the legislature has provided \$5,000,000 annually in grants to fund proactive incentives to implement water quality and water quantity restoration actions. However, in 2003, funding was limited to \$2,000,000 due to deficits in the state budget.

Any individual, entity, state or federal agency, or political subdivision of Arizona may submit an application to the Arizona Water Protection Fund Commission. For further information, please contact the commission at (602) 417-2400 extension 7016.

Clean Water and Drinking Water Revolving Funds – The Water Infrastructure Finance Authority of Arizona (WIFA) is an independent agency of the state authorized to finance the construction, rehabilitation and/or improvement of drinking water, wastewater, wastewater reclamation, other water quality facilities/projects. Generally, WIFA offers borrowers below market interest on loans for 100% of eligible project costs.

- Clean Water Revolving Fund (CWRF) for eligible publicly-held wastewater facilities,
- Drinking Water Revolving Fund (DWRF) for eligible publicly- and privately-held drinking water systems; and,
- Technical Assistance Program (TAP) Pre-design and design grants and loans for eligible wastewater and drinking water systems.

WIFA also manages a Technical Assistance Program. The program offers pre-design and design grants to eligible wastewater and drinking water systems under 10,001 population. Pre-design and design loans are available to all eligible systems. The purpose of the Technical Assistance Program is to enhance project readiness to proceed with a WIFA project construction loan.

Volunteer Monitoring Program – Across the nation, volunteer groups monitor the condition of streams, rivers, lakes, reservoirs, estuaries, coastal waters, wetlands, and wells. They do this because they want to help protect a stream, lake, bay or wetland near where they live, work, or play. Their efforts are of particular value in providing quality data and building stewardship of local waters.

Volunteers can make visual observations of habitat, land uses, and the impacts of storms, measure the physical and chemical characteristics of waters and assess the abundance and diversity of living creatures; aquatic insects, plants, fish, birds, and other wildlife. Volunteers can also clean up garbage-strewn waters and become involved in restoring degraded habitats. The number, variety, and complexity of these projects continues to increase.

During the next year, ADEQ will be devoting efforts to develop a Volunteer Monitoring Program. Volunteer groups across Arizona will be able to collect data to supplement the water quality information collected by ADEQ. The volunteer data can be used by ADEQ to: screen water for potential problems, further research or restoration efforts, establish baseline conditions or trends for waters that would otherwise go unmonitored, and help evaluate the success of Best Management Practices implemented to mitigate problems. Helping volunteer groups to collect credible and scientifically defensible water quality data is important since ADEQ, like many other organizations, must continue to do more with less resources in both personnel and funding.

Since 2003, ADEQ has been working closely with GateWay Community College in Phoenix, Arizona to develop a modular water quality curriculum to train volunteers and others in proper sampling techniques, development of Sample and Analysis Plans and Quality Assurance Plans, and care and maintenance of equipment. The goal is to have a curriculum that can be tailored to the specific needs of the group while providing ADEQ with valuable water quality information.

ADEQ looks forward to working with volunteer monitoring groups. This coordination will also ensure, to the extent practical, that the groups collect data that meet Arizona's credible data requirements in the *Impaired Waters Identification Rule* (Arizona Administrative Code R18-11-6) and can therefore be used to assess the status of water quality in Arizona's surface waters.

Regional 208 Water Quality Management Planning -- Areawide Waste Treatment Management Planning was authorized by the Clean Water Act Section 208 in 1972. It requires regional planning agencies to develop comprehensive water quality management plans. These plans require existing and proposed wastewater treatment facilities to meet the anticipated municipal and industrial waste treatment needs of an area over a 20-year period, as well as provide general planning guidance for nonpoint source, sludge, stormwater and other activities. The plans assure attainment of the state's water quality standards.

Currently, the Designated Planning Agencies are: Maricopa Association of Governments (MAG), Pima Association of Governments (PAG), Northern Arizona Council of Governments (NACOG), Central Arizona Association of Governments (CAAG), Southeastern Arizona Governments Organization (SEAGO), and La Paz, Mohave and Yuma Counties.

The Watershed Management Unit's 208 Program is responsible for three main tasks:

- 208 Consistency Reviews that assure that the proposed facility or usage will be consistent with the existing Certified Regional Water Quality Management Plan,
- Coordinating water quality management plan amendment approvals, and
- Providing technical support and outreach to regional planning agencies in developing comprehensive Water Quality Management Plans.

This outreach includes participation in the Water Quality Management Working Group bi-monthly meetings. The working group consists of the eight Designated Planning Areas and various state, federal or local entities involved in regulatory water quality planning. They meet bi-monthly to review plan amendments and make recommendations to ADEQ on regulated water quality management issues.

ADEQ continues to work with the Designated Planning Areas on incorporating a watershed-based approach to the 208 process. These watershed-based discussions also encourage the Designated Planning Areas to begin focusing more efforts on the nonpoint source side of the program. This is a slow process because the DPAs were established on political jurisdictional lines; however, pollution knows no such boundaries.

Putting it all together

The programs described in this chapter work together to improve the quality of Arizona's water resources. The table below illustrates the water quality improvement process and the parties involved from start to finish, using a demonstration stream. Through this process, ADEQ strives to preserve, protect, and enhance water resources in Arizona by generating scientifically based monitoring data, using clear assessments methods, and encouraging public involvement.

Example Watershed	
Step#1	Surface Water Monitoring and Standards Program Establishes water quality standards for John Doe Creek.
Step #2	Field personnel obtain water quality data that is used to assess the biological, chemical, and physical integrity of John Doe Creek.
Step #3	Volunteer Monitoring Program Works with volunteer groups across Arizona to collect data. These data supplement water quality data and information collected by ADEQ and other agencies on John Doe Creek.
Step #4	Watershed Management Unit Completes state water quality assessment (305b Report) and John Doe Creek is identified as impaired and placed on the 303(d) List of impaired waters for copper and zinc.
Step #5	TMDL Unit Completes a TMDL study for copper and zinc on John Doe Creek.
Step #6	Watershed Management Unit Develops a TMDL implementation plan to improve water quality in the creek and identifies an action plan with milestones to be implemented by the stakeholders.
Step #7	Grants and Outreach Unit The stakeholders within the John Doe Creek watershed apply for a Water Quality Improvement Grant and receive priority because there is a TMDL implementation plan in place.
Step #8	The project(s) is approved and the Grants and Outreach Unit is responsible for managing the project.
Step #9	Volunteer Monitoring Program Works with project managers or other volunteer groups to collect data. These data help to determine the effectiveness of the management measures that are implemented, as identified in the TMDL implementation plan.
Step #10	Grants and Outreach Unit The water quality improvement project is completed and the project is closed out.
Step #11	TMDL Unit The targeted monitoring group conducts follow-up water quality monitoring, which indicate that John Doe Creek is meeting water quality standards and the stream is added to the list of "attaining" waters.

Appendix A. Acronyms, Abbreviations, Definitions, and Units of Measure

AAC	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
AGFD	Arizona Game and Fish Department
Agricultural Irrigation (AgI)	Surface water is used for the irrigation of crops.
Agricultural Livestock Watering (AgL)	Surface water is used as a supply of water for consumption by livestock.
Active Management Area (AMA)	A ground water <u>quantity</u> management area, established under the Groundwater Management Code, established where ground water overdraft is most severe. There are five AMA's: Phoenix, Pinal, Prescott, Santa Cruz, and Tucson.
Aquatic and Wildlife Coldwater Fishery (A&Wc)	Surface water used by animals, plants, or other organisms (including salmonid fish) for habitation, growth, or propagation, generally occurring above 5000 feet elevation.
Aquatic and Wildlife Effluent Dependent Water (A&Wedw)	Surface water that consists of discharges of treated wastewater that is classified as an effluent-dependent water by ADEQ under R18-11-113 of the Arizona Administrative Code. An effluent-dependent water, without the discharge of treated wastewater, would be an ephemeral water. This surface water is used by animals, plants, or other organisms for habitation, growth, or propagation.
Aquatic and Wildlife Ephemeral (A&We)	Surface water that has a channel that is at all times above the water table, and that flows only in direct response to precipitation. Ephemeral water is used by animals, plants, or other organisms (excluding fish) for habitation, growth, or propagation.
Aquatic and Wildlife Warmwater Fishery (A&Ww)	Surface water used by animals, plants, or other organisms (excluding salmonid fish) for habitation, growth, or propagation, generally occurring at elevations less than 5000 feet.
Aquatic Biotic Tissue	Fish tissue or other aquatic organism tissue; criteria are from US Fish and Wildlife Service published action levels.
BEHI	Bank erosion hazard index.
Biological Communities	Groups of fish, macroinvertebrates, algae, or riparian vegetation occupying a habitat or area.
BLM	United States Bureau of Land Management
BoR	United States Bureau of Reclamation
CAP	The Central Arizona Project is a canal system that brings Colorado River water across Arizona, terminating in Tucson.
CERCLA	Comprehensive Environmental Response Compensation and Liability Act. EPA's Superfund Program.
Core Parametric Coverage	Although all parameters with numeric standards are used for assessments, there needs to be at least three sampling events with these specified parameters to assess a designated use as "attaining." This specified parametric coverage does <u>not</u> need to be available to assess a designated use as "impaired."
Credible Data	Surface water monitoring data that is collected meeting requirements established in the Impaired Waters Rule (R18-11-602). These requirements include collecting and analyzing data using a Quality Assurance Plan, Sampling and Analysis Plan, approved methods, approved laboratory, and adequately trained personnel.

Designated Uses	<p>Designated uses are specified for stream segments and lakes in the surface water rules (Arizona Administrative Code R18-11-104). Waterbodies not listed in the rules obtain their designated uses through the "Tributary Rule". Arizona's surface water designated uses include:</p> <p>Aquatic and Wildlife Coldwater Fishery (A&Wc) Warmwater Fishery (A&Ww) Ephemeral Stream (A&We) Effluent Dependent Water (A&Wedw),</p> <p>Domestic Water Source (DWS), Fish Consumption (FC), Full Body Contact (FBC) (i.e., swimming), Partial Body Contact (PBC) (i.e., non-swimming recreation), Agricultural Irrigation (AgI), and Agricultural Livestock Watering (AgL).</p>
Designated Use Support	<p>Attaining – Surface water quality standards are being met based on a minimum of 3 monitoring events that provide seasonal representation and core parametric coverage.</p> <p>Threatened – Surface water quality standards are currently being met, but a trend analysis indicates that the surface water is likely to be impaired before the next assessment.</p> <p>Impaired – Surface water quality standards are not being met based on sufficient number of samples to meet the test of impairment identified in the Impaired Waters Identification Rule (Appendix B).</p> <p>Not attaining – Surface water is not attaining its uses, but a TMDL does not need to be completed because:</p> <ol style="list-style-type: none"> 1) A TMDL has been approved but the surface water is not yet achieving its designated uses, 2) Another action is occurring that so that the surface water is expected to attain its uses before the next assessment, 3) The impairment is due to pollution where a pollutant loading cannot be calculated (e.g., hydromodification), 4) Impaired according to the former turbidity standard (subcategory created by ADEQ for this assessment). <p>Inconclusive – Monitoring or other assessment information available is insufficient to assess the surface water as "attaining," "threatened," "impaired," or "not attaining."</p> <p>Not assessed – Only one or two water sample or no samples. No information indicating that a narrative standard is being violated.</p>
Domestic Water Source (DWS)	Surface water is used as a potable water supply. Coagulation, sedimentation, filtration, disinfection or other treatments may be necessary to yield a finished water suitable for human consumption.
Effluent Dependent Water	(See Aquatic and Wildlife Effluent Dependent Water)
EMAP	US Environmental Protection Agency's Environmental Monitoring and Assessment Project.
EPA or USEPA	The United States Environmental Protection Agency
Ephemeral Flow	(See Aquatic and Wildlife Ephemeral Water)
Exceed/Exceedance	Monitoring data results were greater than a maximum standard or below a minimum standard.
Fish Consumption (FC)	Surface water is used by humans for harvesting aquatic organisms for consumption. Harvestable aquatic organisms include, but are not limited to, fish, clams, crayfish, and frogs.
Full Body Contact (FBC)	Surface water use causes the human body to come into direct contact with the water to the point of complete submergence (e.g., swimming). The use is such that ingestion of the water is likely to occur and certain sensitive body organs (e.g., eyes, ears, or nose) may be exposed to direct contact with the water.
IBWC	International Boundary and Water Commission, an international commission established to resolve water quality issues along the United States border with Mexico.
Intermittent Flow	Surface water flows continuously only at certain times of the year, as when it receives water from springs or from some surface source such as melting snow (i.e., seasonal).

Macroinvertebrates	Stream bottom dwelling insects and other organisms that inhabit freshwater habitats for at least part of their life cycle and are retained by a mesh screen size greater than 0.2 millimeters.
MCL	Maximum Contaminant Level. Standards for public drinking water systems. (See also SMCL.)
Narrative Water Quality Standards	(R18-11-108) Surface waters will be free from pollutants in amounts or combinations that: <ul style="list-style-type: none"> - Settle to form bottom deposits that impair aquatic life or recreational uses; - Cause an objectionable odor; - Cause an off-taste or odor in drinking water; - Cause an off-flavor in aquatic organisms or waterfowl; - Are "toxic" to humans, animals, plants, or other organisms; - Cause the growth of algae or aquatic plants that impair aquatic life or recreational uses; - Cause or contribute to a violation of an aquifer water quality standard (R18-11-405 through 406; or - Change the color of the surface water from natural background levels.
Naturally Occurring Condition	The condition of a surface water or segment that would have occurred in the absence of pollutant loadings as a result of human activity.
NAWQA	The US Geological Survey's National Water Quality Assessment Program.
Nonpoint Source	These sources of pollutants come from nondiscrete discharges such as atmospheric deposition, contaminated sediment, and land uses that generate polluted runoff like agriculture, urban land development, forestry, construction, and on-site sewage disposal systems. Nonpoint source pollution also encompasses activities that either change the natural flow regime of a stream or wetland or result in habitat disturbance.
NPDES / AZPDES	National Pollutant Discharge Elimination System is a federal point source discharge permit. ADEQ is to obtain primacy for this program, which will use the acronym AZPDES in describing this permit.
Partial Body Contact (PBC)	Surface water is used so that the human body to come into direct contact with the water, but normally not at the point of complete submergence (i.e., non-swimming recreation). The use is such that ingestion of the water is not likely to occur, nor will sensitive body organs (e.g., eyes, ears, or nose) normally be exposed to direct contact with the water.
Perennial Flow	Surface water that flows continuously.
Point Source	These sources of pollution are discrete, identifiable sources such as pipes or ditches that are primarily associated with industries and municipal sewage treatment plants. (See nonpoint source.)
Public Water Supply	A water system which conveys water for human consumption to 15 or more service connections or serves an average of at least 25 persons per day (as defined by the federal Safe Drinking Water Act).
QAP	Quality Assurance Plan. This is a written plan detailing how environmental data will be collected, analyzed, assessed for quality, and establishes the data quality objectives that the data must meet.
RCRA	Resource Conservation and Recovery Act established by the federal government to control hazardous wastes.
Reach	A segment of a stream. EPA originally divided Arizona's streams on the USGS hydrology at 1:100,000 scale map into reaches based on hydrological features such as tributaries. ADEQ has further subdivided these reaches based on changes in designated use support and water quality.
Sampling Event	A "sampling event" is one or more samples taken under consistent conditions on one or more consecutive days at a specific location.
SAP	Sampling and Analysis Plan. This is a written site-specific plan to ensure that samples collected and analyzed meet data quality objectives and are representative of surface water conditions at the time of sampling.
SMCL	Secondary Maximum Contaminant Level. A guidance level established by EPA for substances that create only taste or odor problems in drinking water.
SRP	Salt River Project

Surface Water	<p>These are "waters of the United States", which include:</p> <ul style="list-style-type: none"> - All waters which are, have been, or could be used for interstate or foreign commerce; - All interstate waters or wetlands; - All lakes, reservoirs, natural ponds, rivers, streams (including intermittent and ephemeral streams), creeks, washes, draws, mudflats, sandflats, wetlands, backwaters, playas (etc.) which could be used by visitors to our state for recreation, from which fish or shellfish could be taken or sold, or which is used for industrial purposes; or - All impoundments, wetlands, or tributaries of above waters. <p>(Summarized from Arizona Administrative Code R18-11-101)</p>
SVOC	Semi-volatile organic chemical or compound (see also VOC)
Toxic Chemicals	Pollutants or combinations of pollutants which, after discharge and exposure (contact, ingestion, inhalation, or assimilation) to any organism (either directly from the environment or indirectly through the food chain), may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), or physical deformations in such organisms or offspring.
TMDL	Total Maximum Daily Load. A TMDL is a written, quantitative plan and analysis to determine the maximum loading on a pollutant basis that a surface water can assimilate and still attain and maintain a specific water quality standard during all conditions. The TMDL allocates the loading capacity of the surface water to point sources and nonpoint sources identified in the watershed, accounting for natural background levels and seasonal variation, with an allocation set aside as a margin of safety.
Tributary Rule	<p>This rule (Arizona Administrative Code R18-11-105, amended in 1996) is used to determine "Designated Uses" for waterbodies not specifically listed in the surface water protection rules.</p> <ul style="list-style-type: none"> - If the surface water is "Ephemeral," then the Aquatic and Wildlife Ephemeral and Partial Body Contact standards apply. - If the surface water is "Effluent Dependent Water," then the Aquatic and Wildlife Effluent Dependent Water and Partial Body Contact standards apply. - If the surface water has salmonids present and is not A&Wedw (above), then the designated uses are: Aquatic and Wildlife Coldwater Fishery, Fish Consumption, and other designated uses for the nearest downstream surface water listed in the rules that is not an ephemeral water or an effluent dependent water. - If the surface water does not have salmonids present and is not A&We or A&Wedw (above), then the designated uses are: Aquatic and Wildlife Warmwater Fishery, Fish Consumption, and other designated uses for the nearest downstream surface water listed in the rules that is not an ephemeral water or an effluent dependent water.
Trophic Status	<p>Lakes can be classified by the level of nutrients available for primary biological production. Lakes generally progress through the following trophic phases or states:</p> <p>Oligotrophic -- Low algal or plant productivity;</p> <p>Mesotrophic -- Medium algal or plant productivity;</p> <p>Eutrophic -- High algal or plant productivity; and productivity;</p> <p>Hypereutrophic -- Very high algal or plant productivity and light limited. That is, instead of growth being limited by nutrient availability (as it is in other trophic conditions), growth becomes limited by light.</p>
Unique Water	A surface water classified as an outstanding state resource water under Arizona Administrative Code R18-11-112.
USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
USGS	United States Geological Survey
UST	Underground Storage Tanks Program for eliminating the release of toxic chemicals from storage tanks.
VOC	Volatile organic chemical or compound (e.g., solvents)
Waters of the United States	(See "surface water" definition.)

WTP	Water Treatment Plant for drinking water treatment.
WWTP	Wastewater Treatment Plant
WQARF	Water Quality Assurance Revolving Fund. Arizona's Superfund program for cleanup of contaminated sites.

CHEMICAL ABBREVIATIONS

BTEX	combination of petroleum hydrocarbons including: benzene, toluene, ethylbenzene, xylene
DCA	dichloroethane
DCB	dichlorobenzene
DCE	dichloroethene
MTBE	methyl tertiary butyl ether
PCE	tetrachloroethane
TCE	trichloroethene

UNITS OF MEASUREMENT AND CONVERSIONS

MEASUREMENT USE	UNIT	EQUIVALENT UNITS OR CONVERSION
Bacteria concentration in water	colony forming units (CFS) per 100 milliliter	
Chemical concentrations in water	milligram per liter (mg/L) microgram per liter (μ g/L)	1 mg/L = 0.001 grams per liter 1 mg/L = parts per million (ppm) 1 μ g/L = 0.001 milligram per liter (mg/l) 1 μ g/L = 0.000001 grams per liter 1 μ g/L = 1 parts per billion (ppb)
Chemical concentrations in animal tissue and sediment	milligram per kilogram (mg/kg) microgram per kilogram (μ g/kg)	1 mg/kg = 1 parts per million (ppm) 1 mg/kg = 1 microgram per gram (μ g/g) 1 μ g/kg = 1 parts per billion (ppb)
Ground water quantity	acre-feet	1 acre-foot = 325,900 gallons
pH in water	standard unit (SU)	
Radiochemical concentrations in water	picrouries per liter (pCi/L)	
Rate of flow	cubic feet per second (cfs)	1 cfs = 448.83 gallons per minute (gpm) 1 cfs = 646,000 gallons per day (gpd)
Lake area	acres	
Stream length	miles	1 mile = 1.6 kilometers (km)
Watershed size	square miles	1 square mile = 640 acres per square mile
Water turbidity (ability to light to travel through the water)	Nephelometric Turbidity Unit (NTU)	

Appendix B. Arizona's Statute and Rules for Impaired Waters

ARIZONA'S REVISED STATUTES ARTICLE 2.1 TOTAL MAXIMUM DAILY LOADS 49-231 TO 49-238 (effective July 2000)

49-231. Definitions

In this article, unless the context otherwise requires:

1. "Impaired water" means a navigable water for which credible scientific data exists that satisfies the requirements of section 49-232 and that demonstrates that the water should be identified pursuant to 33 United States Code section 1313(d) and the regulations implementing that statute.
2. "Surface water quality standard" means a standard adopted for a navigable water pursuant to sections 49-221 and 49-222 and section 303(c) of the clean water act (33 United States Code section 1313(c)).
3. "TMDL implementation plan" means a written strategy to implement a total maximum daily load that is developed for an impaired water. TMDL implementation plans may rely on any combination of the following components that the department determines will result in achieving and maintaining compliance with applicable surface water quality standards in the most cost-effective and equitable manner:
 - (a) Permit limitations.
 - (b) Best management practices.
 - (c) Education and outreach efforts.
 - (d) Technical assistance.
 - (e) Cooperative agreements, voluntary measures and incentive-based programs.
 - (f) Load reductions resulting from other legally required programs or activities.
 - (g) Land management programs.
 - (h) Pollution prevention planning, waste minimization or pollutant trading agreements.
 - (i) Other measures deemed appropriate by the department.
4. "Total maximum daily load" means an estimation of the total amount of a pollutant from all sources that may be added to a water while still allowing the water to achieve and maintain applicable surface water quality standards. Each total maximum daily load shall include allocations for sources that contribute the pollutant to the water, as required by section 303(d) of the clean water act (33 United States Code section 1313(d)) and regulations implementing that statute to achieve applicable surface water quality standards.

49-232. Lists of impaired waters; data requirements; rules

A. At least once every five years, the department shall prepare a list of impaired waters for the purpose of complying with section 303(d) of the clean water act (33 United States Code section 1313(d)). The department shall provide public notice and allow for comment on a draft list of impaired waters prior to its submission to the United States Environmental Protection Agency. The department shall prepare written responses to comments received on the draft list. The department shall publish the list of impaired waters that it plans to submit initially to the regional administrator and a summary of the responses to comments on the draft list in the Arizona Administrative Register at least forty-five days before submission of the list to the regional administrator. Publication of the list in the Arizona Administrative Register is an appealable agency action pursuant to title 41, chapter 6, article 10 that may be appealed by any party that submitted written comments on the draft list. If the department receives a notice of appeal of a listing pursuant to section 41-1092, subsection B within forty-five days of the publication of the list in the Arizona Administrative Register, the department shall not include the challenged listing in its initial submission to the regional administrator. The department may subsequently submit the challenged listing to the regional administrator if the listing is upheld in the director's final administrative decision pursuant to section 41-1092.08, or if the challenge to the listing is withdrawn prior to a final administrative decision.

B. In determining whether a water is impaired, the department shall consider only reasonably current credible and scientifically defensible data that the department has collected or has received from another source. Results of water sampling or other assessments of water quality, including physical or biological health, shall be considered credible and scientifically defensible data only if the department has determined all of the following:

1. Appropriate quality assurance and quality control procedures were followed and documented in collecting and analyzing the data.
2. The samples or analyses are representative of water quality conditions at the time the data was collected.
3. The data consists of an adequate number of samples based on the nature of the water in question and the parameters being analyzed.
4. The method of sampling and analysis, including analytical, statistical and modeling methods, is generally accepted and validated in the scientific community as appropriate for use in assessing the condition of the water.

C. The department shall adopt by rule the methodology to be used in identifying waters as impaired. The rules shall specify all of the following:

1. Minimum data requirements and quality assurance and quality control requirements that are consistent with subsection B of this section and that must be satisfied in order for the data to serve as the basis for listing and delisting decisions.
2. Appropriate sampling, analytical and scientific techniques that may be used in assessing whether a water is impaired.
3. Any statistical or modeling techniques that the department uses to assess or interpret data.
4. Criteria for including and removing waters from the list of impaired waters, including any implementation procedures developed pursuant to subsection F of this section. The criteria for removing a water from the list of impaired waters shall not be any more stringent than the criteria for adding a water to that list.

D. In assessing whether a water is impaired, the department shall consider the data available in light of the nature of the water in question, including whether the water is an ephemeral water. A water in which pollutant loadings from naturally occurring conditions alone are sufficient to cause a violation of applicable surface water quality standards shall not be listed as impaired.

E. If the department has adopted a numeric surface water quality standard for a pollutant and that standard is not being exceeded in a water, the department shall not list the water as impaired based on a conclusion that the pollutant causes a violation of a narrative or biological standard unless:

1. The department has determined that the numeric standard is insufficient to protect water quality.
2. The department has identified specific reasons that are appropriate for the water in question, that are based on generally accepted scientific principles and that support the department's determination.

F. Before listing a navigable water as impaired based on a violation of a narrative or biological surface water quality standard and after providing an opportunity for public notice and comment, the department shall adopt implementation procedures that specifically identify the objective basis for determining that a violation of the narrative or biological criterion exists. A total maximum daily load designed to achieve compliance with a narrative or biological surface water quality standard shall not be adopted until the implementation procedure for the narrative or biological surface water quality

standard has been adopted.

G. On request, the department shall make available to the public data used to support the listing of a water as impaired and may charge a reasonable fee to persons requesting the data.

H. By January 1, 2002, the department shall review the list of waters identified as impaired as of January 1, 2000 to determine whether the data that supports the listing of those waters complies with this section. If the data that supports a listing does not comply with this section, the listed water shall not be included on future lists submitted to the United States environmental protection agency pursuant to 33 United States Code section 1313(d) unless in the interim data that satisfies the requirements of this section has been collected or received by the department.

I. The department shall add a water to or remove a water from the list using the process described in section 49-232, subsection A outside of the normal listing cycle if it collects or receives credible and scientifically defensible data that satisfies the requirements of this section and that demonstrates that the current quality of the water is such that it should be removed from or added to the list. A listed water may no longer warrant classification as impaired or an unlisted water may be identified as impaired if the applicable surface water quality standards, implementation procedures or designated uses have changed or if there is a change in water quality.

49-233. Priority ranking and schedule

A. Each list developed by the department pursuant to section 49-232 shall contain a priority ranking of navigable waters identified as impaired and for which total maximum daily loads are required pursuant to section 49-234 and a schedule for the development of all required total maximum daily loads.

B. In the first list submitted to the United States environmental protection agency after the effective date of this article, the schedule shall be sufficient to ensure that all required total maximum daily loads will be developed within fifteen years of the date the list is approved by the environmental protection agency. Total maximum daily loads that are required to be developed for navigable waters that are included for the first time on subsequent lists shall be developed within fifteen years of the initial inclusion of the water on the list.

C. As part of the rule making prescribed by section 49-232, subsection C,

the department shall identify the factors that it will use to prioritize navigable waters that require development of total maximum daily loads. At a minimum and to the extent relevant data is available, the department shall consider the following factors in prioritizing navigable waters for development of total maximum daily loads:

1. The designated uses of the navigable water.
2. The type and extent of risk from the impairment to human health or aquatic life.
3. The degree of public interest and support, or its lack.
4. The nature of the navigable water, including whether it is an ephemeral, intermittent or effluent-dependent water.
5. The pollutants causing the impairment.
6. The severity, magnitude and duration of the violation of the applicable surface water quality standard.
7. The seasonal variation caused by natural events such as storms or weather patterns.
8. Existing treatment levels and management practices.
9. The availability of effective and economically feasible treatment techniques, management practices or other pollutant loading reduction measures.
10. The recreational and economic importance of the water.
11. The extent to which the impairment is caused by discharges or activities that have ceased.
12. The extent to which natural sources contribute to the impairment.
13. Whether the water is accorded special protection under federal or state water quality law.
14. Whether action that is taken or that is likely to be taken under other programs, including voluntary programs, is likely to make significant progress toward achieving applicable standards even if a total maximum daily load is not developed.
15. The time expected to be required to achieve compliance with applicable surface water quality standards.
16. The availability of documented, effective analytical tools for developing a total maximum daily load for the water with reasonable accuracy.
17. Department resources and programmatic needs.

49-234. Total maximum daily loads; implementation plans

A. The department shall develop total maximum daily loads for those navigable waters listed as impaired pursuant to this article and for which total maximum daily loads are required to be adopted pursuant to 33 United States Code section 1313(d) and the regulations implementing that statute. The department may estimate total maximum daily loads for navigable waters not listed as impaired pursuant to this article, for the purposes of developing information to satisfy the requirements of 33 United States Code section 1313(d)(3), only after it has developed total maximum daily loads for all navigable waters identified as impaired pursuant to this article or if necessary to support permitting of new point source discharges.

B. In developing total maximum daily loads, the department shall use only statistical and modeling techniques that are properly validated and broadly accepted by the scientific community. The modeling technique may vary based on the type of water and the quantity and quality of available data that meets the quality assurance and quality control requirements of section 49-232. The department may establish the statistical and modeling techniques in rules adopted pursuant to section 49-232, subsection C.

C. Each total maximum daily load shall:

1. Be based on data and methodologies that comply with section 49-232.
2. Be established at a level that will achieve and maintain compliance with applicable surface water quality standards.
3. Include a reasonable margin of safety that takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. The margin of safety shall not be used as a substitute for adequate data when developing the total maximum daily load.
4. Account for seasonal variations that may include setting total maximum daily loads that apply on a seasonal basis.

D. For each impaired water, the department shall prepare a draft estimate of the total amount of each pollutant that causes the impairment from all sources and that may be added to the navigable water while still allowing the navigable water to achieve and maintain applicable surface water quality standards. The department shall provide public notice and allow for comment on each draft estimate and shall prepare written responses to comments received on the draft estimates. The department shall publish the determinations of total pollutant loadings that will not result in impairment that it intends to submit initially to the regional administrator, along with a summary of the responses to comments

on the estimated loadings, in the Arizona administrative register at least forty-five days before submission of the loadings to the regional administrator. Publication of the loadings in the administrative register is an appealable agency action pursuant to title 41, chapter 6, article 10 that may be appealed by any party that submitted written comments on the estimated loadings. If the department receives a notice of appeal of a loading pursuant to section 41-1092, subsection B within forty-five days of the publication of the loading in the Arizona administrative register, the department shall not submit the challenged loading to the regional administrator until either the challenge to the loading is withdrawn or the director has made a final administrative decision pursuant to section 41-1092.08.

E. After each final loading pursuant to subsection D of this section is adopted and consistent with subsection F of this section, the department shall determine draft allocations among the contributing sources that are sufficient to achieve the total loading established pursuant to subsection D of this section. the department's proposed determination of allocations shall be subject to public notice and comment. The department shall prepare written responses to comments received on the draft allocations. After consideration of public comment received, the department shall publish the allocations and a summary of the responses to comments in the Arizona administrative register. The publication shall occur at least forty-five days before submission of the allocations to the regional administrator, if such submission is required by the rules implementing 33 United States Code section 1313(d). Publication of the allocations in the Arizona administrative register is an appealable agency action pursuant to title 41, chapter 6, article 10 that may be appealed by any party that submitted written comments on the draft allocations. If the department receives a notice of appeal of an allocation pursuant to section 41-1092, subsection B within forty-five days of the publication of the allocation in the Arizona administrative register, the department shall not take further action on the challenged allocation, or submit it to the regional administrator if such submission is required by the rules implementing 33 United States Code section 1313(d), until either the challenge to the loading is withdrawn or the director has made a final administrative decision pursuant to section 41-1092.08.

F. The department shall make reasonable and equitable allocations among sources when developing total maximum daily loads. At a minimum, the department shall consider the following factors in making allocations:

1. The environmental, economic and technological feasibility of achieving the

allocation.

2. The cost and benefit associated with achieving the allocation.

3. Any pollutant loading reductions that are reasonably expected to be achieved as a result of other legally required actions or voluntary measures.

G. For each total maximum daily load, the department shall establish a TMDL implementation plan that explains how the allocations and any reductions in existing pollutant loadings will be achieved. Any reductions in loadings from nonpoint sources shall be achieved voluntarily. The department shall provide for public notice and comment on each TMDL implementation plan. Any sampling or monitoring components of a TMDL implementation plan shall comply with section 49-232.

H. Each TMDL implementation plan shall provide the time frame in which compliance with applicable surface water quality standards is expected to be achieved. The plan may include a phased process with interim targets for load reductions. Longer time frames are appropriate in situations involving multiple dischargers, technical, legal or economic barriers to achieving necessary load reductions, scientific uncertainty regarding data quality or modeling, significant loading from natural sources or significant loading resulting from discharges or activities that have already ceased.

I. For navigable waters that are impaired due in part to historical factors that are difficult to address, including contaminated sediments, the department shall consider those historical factors in determining allocations for existing point source discharges of the pollutant or pollutants that cause the impairment. In developing total maximum daily loads for those navigable waters, the department shall use a phased approach in which expected long-term loading reductions from the historical sources are considered in establishing short-term allocations for the point sources. While total maximum daily loads and TMDL implementation plans are being completed, any permits issued for the point sources are deemed consistent with this article if the permits require reasonable reductions in the discharges of the pollutants causing the impairment and are not required to include additional reductions if those reductions would not significantly contribute to attainment of surface water quality standards.

J. After a total maximum daily load and a TMDL implementation plan have been adopted for a navigable water, the department shall review the status of the navigable water at least once every five years to determine if compliance with applicable surface water quality standards has been achieved. If

compliance with applicable surface water quality standards has not been achieved, the department shall evaluate whether modification of the total maximum daily load or TMDL implementation plan is required.

49-235. Rules

The department shall adopt any rules necessary to implement this article.

49-236. Report

By September 1, 2005, the department shall submit a report to the governor, the speaker of the house of representatives and the president of the senate detailing progress made under this program and shall provide a copy to the secretary of state and the department of library, archives and public records. At a minimum, the report shall:

1. Evaluate the effectiveness of the total maximum daily load program and identify any recommended statutory changes to make the program more efficient, effective and equitable.
2. Assess the extent to which water quality problems that cannot be effectively addressed under the total maximum daily load program may be addressed under other federal or state laws.
3. Identify the number of appeals of department decisions under this article sought pursuant to title 41, chapter 6, article 10 and the disposition of those appeals, and assess the impact of those appeals on the department's ability to administer the program effectively.

49-237. Impact of successful judicial appeal of Arizona Department of Environmental Quality decision

If a person appeals to court and succeeds in overturning or modifying a final administrative decision of the director pursuant to this article in an appeal initiated pursuant to title 41, chapter 6, article 10, within thirty days of the court's decision the department shall take the steps necessary to implement the court's decision, unless the director's decision that is overturned or modified was submitted to and approved by the regional administrator, in which case within thirty days of the court's decision the department shall request that the regional administrator modify the approval to reflect the court's decision.

49-238. Program termination

The program established by this article ends on July 1, 2010 pursuant to section 41-3102.

**TITLE 18. ENVIRONMENTAL QUALITY
CHAPTER 11. DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER QUALITY STANDARDS**

ARTICLE 6. IMPAIRED WATER IDENTIFICATION

R18-11-601. Definitions

In addition to the definitions established in A.R.S. §§ 49-201 and 49-231, and A.A.C. R18-11-101, the following terms apply to this Article:

1. "303(d) List" means the list of surface waters or segments required under section 303(d) of the Clean Water Act and A.R.S. Title 49, Chapter 2, Article 2.1, for which TMDLs are developed and submitted to EPA for approval.
2. "Attaining" means there is sufficient, credible, and scientifically defensible data to assess a surface water or segment and the surface water or segment does not meet the definition of impaired or not attaining.
3. "AZPDES" means the Arizona Pollutant Elimination Discharge System.
4. "Credible and scientifically defensible data" means data submitted, collected, or analyzed using:
 - a. Quality assurance and quality control procedures under A.A.C. R18-11-602;
 - b. Samples or analyses representative of water quality conditions at the time the data were collected;
 - c. Data consisting of an adequate number of samples based on the nature of the water in question and the parameters being analyzed; and
 - d. Methods of sampling and analysis, including analytical, statistical, and modeling methods that are generally accepted and validated by the scientific community as appropriate for use in assessing the condition of the water.
5. "Designated use" means those uses specified in 18 A.A.C. 11, Article 1 for each surface water or segment whether or not they are attaining.
6. "EPA" means the U.S. Environmental Protection Agency.
7. "Impaired water" means a Navigable water for which credible scientific data exists that satisfies the requirements of § 49-232 and that demonstrates that the water should be identified pursuant to 33 United States Code § 1313(d) and the regulations implementing that statute. A.R.S. § 49-231(1).
8. "Laboratory detection limit" means a "Method Reporting Limit" (MRL) or "Reporting Limit" (RL). These analogous terms describe the laboratory reported value, which is the lowest concentration level included on the calibration curve from the analysis of a pollutant that can be quantified in terms

of precision and accuracy.

9. "Monitoring entity" means the Department or any person who collects physical, chemical, or biological data used for an impaired water identification or a TMDL decision.

10. "Naturally occurring condition" means the condition of a surface water or segment that would have occurred in the absence of pollutant loadings as a result of human activity.

11. "Not attaining" means a surface water is assessed as impaired, but is not placed on the 303(d) List because:

- a. A TMDL is prepared and implemented for the surface water;
- b. An action, which meets the requirements of R18-11-604(D)(2)(h), is occurring and is expected to bring the surface water to attaining before the next 303(d) List submission; or
- c. The impairment of the surface water is due to pollution but not a pollutant, for which a TMDL load allocation cannot be developed.

12. "NPDES" means National Pollutant Discharge Elimination System.

13. "Planning List" means a list of surface waters and segments that the Department will review and evaluate to determine if the surface water or segment is impaired and whether a TMDL is necessary.

14. "Pollutant" means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. 33 U.S.C. 1362(6). Characteristics of water, such as dissolved oxygen, pH, temperature, turbidity, and suspended sediment are considered pollutants if they result or may result in the non-attainment of a water quality standard.

15. "Pollution" means "the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water. 33 U.S.C. 1362(19).

16. "QAP" means a quality assurance plan detailing how environmental data operations are planned, implemented, and assessed for quality during the duration of a project.

17. "Sampling event" means one or more samples taken under consistent conditions on one or more days at a distinct station or location.

18. "SAP" means a site specific sampling and analysis plan that describes the specifics of sample collection to ensure that data quality objectives are met and that samples collected and analyzed are representative of surface water conditions at the time of sampling.

19. "Spatially independent sample" means a sample that is collected at a distinct station or location. The sample is independent if the sample was

collected:

- a. More than 200 meters apart from other samples, or
 - b. Less than 200 meters apart, and collected to characterize the effect of an intervening tributary, outfall or other pollution source, or significant hydrographic or hydrologic change.
20. "Temporally independent sample" means a sample that is collected at the same station or location more than seven days apart from other samples.
21. "Threatened" means that a surface water or segment is currently attaining its designated use, however, trend analysis, based on credible and scientifically defensible data, indicates that the surface water or segment is likely to be impaired before the next listing cycle.
22. "TMDL" means total maximum daily load.
23. "TMDL decision" means a decision by the Department to:
- a. Prioritize an impaired water for TMDL development,
 - b. Develop a TMDL for an impaired water, or
 - c. Develop a TMDL implementation plan.
24. *"Total maximum daily load" means an estimation of the total amount of a pollutant from all sources that may be added to a water while still allowing the water to achieve and maintain applicable surface water quality standards. Each total maximum daily load shall include allocations for sources that contribute the pollutant to the water, as required by section 303(d) of the clean water act (33 United States Code section 1313(d)) and regulations implementing that statute to achieve applicable surface water quality standards. A.R.S. § 49-231(4).*
25. "Water quality standard" means a standard composed of designated uses (classification of waters), the numerical and narrative criteria applied to the specific water uses or classification, the antidegradation policy, and moderating provisions, for example, mixing zones, site-specific alternative criteria, and exemptions, in A.A.C. Title 18, Chapter 11, Article 1.
26. "WQARF" means the water quality assurance revolving fund established under A.R.S. § 49-282.

R18-11-602. Credible Data

A. Data are credible and relevant to an impaired water identification or a TMDL decision when:

1. Quality Assurance Plan. A monitoring entity, which contribute data for an impaired water identification or a TMDL decision, provides the Department with a QAP that contains, at a minimum, the elements listed in subsections (A)(1)(a) through (A)(1)(f). The

Department may accept a QAP containing less than the required elements if the Department determines that an element is not relevant to the sampling activity and that its omission will not impact the quality of the results based upon the type of pollutants to be sampled, the type of surface water, and the purpose of the sampling.

- a. An approval page that includes the date of approval and the signatures of the approving officials, including the project manager and project quality assurance manager;
- b. A project organization outline that identifies all key personnel, organizations, and laboratories involved in monitoring, including the specific roles and responsibilities of key personnel in carrying out the procedures identified in the QAP and SAP, if applicable;
- c. Sampling design and monitoring data quality objectives or a SAP that meets the requirements of subsection (A)(2) to ensure that:
 - i. Samples are spatially and temporally representative of the surface water,
 - ii. Samples are representative of water quality conditions at the time of sampling, and
 - iii. The monitoring is reproducible;
- d. The following field sampling information to assure that samples meet data quality objectives:
 - i. Sampling and field protocols for each parameter or parametric group, including the sampling methods, equipment and containers, sample preservation, holding times, and any analysis proposed for completion in the field or outside of a laboratory;
 - ii. Field and laboratory methods approved under subsection(A)(5);
 - iii. Handling procedures to identify samples and custody protocols used when samples are brought from the field to the laboratory for analysis;
 - iv. Quality control protocols that describe the number and type of field quality control samples for the project that includes, if appropriate for the type of sampling being conducted, field blanks, travel blanks, equipment blanks, method blanks, split samples, and duplicate samples;
 - v. Procedures for testing, inspecting, and maintaining field equipment;
 - vi. Field instrument calibration procedures that describe how and when field sampling and analytical instruments will be

calibrated;

vii. Field notes and records that describe the conditions that require documentation in the field, such as weather, stream flow, transect information, distance from water edge, water and sample depth, equipment calibration measurements, field observations of watershed activities, and bank conditions. Indicate the procedures implemented for maintaining field notes and records and the process used for attaching pertinent information to monitoring results to assist in data interpretation;

viii. Minimum training and any specialized training necessary to do the monitoring, that includes the proper use and calibration of field equipment used to collect data, sampling protocols, quality assurance/quality control procedures, and how training will be achieved;

e. Laboratory analysis methods and quality assurance/quality control procedures that assure that samples meet data quality objectives, including:

- i. Analytical methods and equipment necessary for analysis of each parameter, including identification of approved laboratory methods described in subsection (A)(5), and laboratory detection limits for each parameter;
- ii. The name of the designated laboratory, its license number, if licensed by the Arizona Department of Health Services, and the name of a laboratory contact person to assist the Department with quality assurance questions;
- iii. Quality controls that describe the number and type of laboratory quality control samples for the project, including, if appropriate for the type of sampling being conducted, field blanks, travel blanks, equipment blanks, method blanks, split samples, and duplicate samples;
- iv. Procedures for testing, inspecting, and maintaining laboratory equipment and facilities;
- v. A schedule for calibrating laboratory instruments, a description of calibration methods, and a description of how calibration records are maintained; and
- vi. Sample equipment decontamination procedures that outline specific methods for sample collection and preparation of equipment, identify the frequency of decontamination, and describe the procedures used to verify

decontamination;

- f. Data review, management, and use that includes the following:
- i. A description of the data handling process from field to laboratory, from laboratory to data review and validation, and from validation to data storage and use. Include the role and responsibility of each person for each step of the process, type of database or other storage used, and how laboratory and field data qualifiers are related to the laboratory result;
 - ii. Reports that describe the intended frequency, content, and distribution of final analysis reports and project status reports;
 - iii. Data review, validation, and verification that describes the procedure used to validate and verify data, the procedures used if errors are detected, and how data are accepted, rejected, or qualified; and
 - iv. Reconciliation with data quality objectives that describes the process used to determine whether the data collected meets the project objectives, which may include discarding data, setting limits on data use, or revising data quality objectives.

2. Sampling and analysis plan.

a. A monitoring entity shall develop a SAP that contains, at a minimum, the following elements:

- i. The experimental design of the project, the project goals and objectives, and evaluation criteria for data results;
- ii. The background or historical perspective of the project;
- iii. Identification of target conditions, including a discussion of whether any weather, seasonal variations, stream flow, lake level, or site access may affect the project and the consideration of these factors;
- iv. The data quality objectives for measurement of data that describe in quantitative and qualitative terms how the data meet the project objectives of precision, accuracy, completeness, comparability, and representativeness;
- v. The types of samples scheduled for collection;
- vi. The sampling frequency;
- vii. The sampling periods;
- viii. The sampling locations and rationale for the site selection, how site locations are benchmarked, including scaled maps indicating approximate location of sites; and

ix. A list of the field equipment, including tolerance range and any other manufacturer's specifications relating to accuracy and precision.

b. The Department may accept a SAP containing less than the required elements if the Department determines that an element is not relevant to the sampling activity and that its omission will not impact the quality of the results based upon the type of pollutants to be samples, the type of surface water, and the purpose of the sampling.

3. [Options] The monitoring entity may include any of the following in the QAP or SAP:

- a. The name, title, and role of each person and organization involved in the project, identifying specific roles and responsibilities for carrying out the procedures identified in the QAP and SAP;
- b. A distribution list of each individual and organization receiving a copy of the approved QAP and SAP;
- c. A table of contents;
- d. A health and safety plan;
- e. The inspection and acceptance requirements for supplies;
- f. The data acquisition that describes types of data not obtained through this monitoring activity, but used in the project;
- g. The audits and response actions that describe how field, laboratory, and data management activities and sampling personnel are evaluated to ensure data quality, including a description of how the project will correct any problems identified during these assessments; and
- h. The waste disposal methods that identify wastes generated in sampling and methods for disposal of those wastes.

4. Exceptions. The Department may determine that the following data are also credible and relevant to an impaired water identification or TMDL decision when data were collected, provided the conditions in subsections (A)(5), (A)(6), and (B) are met, and where the data were collected in the surface water or segment being evaluated for impairment:

- a. The data were collected before July 12, 2002 and the Department determines that the data yield results of comparable reliability to the data collected under subsections (A)(1) and (A)(2);
- b. The data were collected after July 12, 2002 as part of an ongoing monitoring effort by a governmental agency and the Department determines that the data yield results of comparable reliability to the data collected under subsections (A)(1) and (A)(2); or
- c. The instream water quality data were or are collected under the

terms of a NPDES or AZPDES permit or a compliance order issued by the Department or EPA, a consent decree signed by the Department or EPA, or a sampling program approved by the Department or EPA under WQARF or CERCLA, and the Department determines that the data yield results of comparable reliability to data collected under subsections (A)(1) and (A)(2).

5. Data collection, preservation, and analytical procedures. The monitoring entity shall collect, preserve, and analyze data using methods of sample collection, preservation, and analysis established under A.A.C. R9-14-610.

6. Laboratory. The monitoring entity shall ensure that chemical and toxicological samples are analyzed in a state-licensed laboratory, a laboratory exempted by the Arizona Department of Health Services for specific analyses, or a federal or academic laboratory that can demonstrate proper quality assurance/quality control procedures substantially equal to those required by the Arizona Department of Health Services, and shall ensure that the laboratory uses approved methods identified in A.A.C. R9-14-610.

B. Documentation for data submission. The monitoring entity shall provide the Department with the following information either before or with data submission:

- 1. A copy of the QAP or SAP, or both, revisions to a previously submitted QAP or SAP, and any other information necessary for the Department to evaluate the data under subsection (A)(4);
- 2. The applicable dates of the QAP and SAP, including any revisions;
- 3. Written assurance that the methods and procedures specified in the QAP and SAP were followed;
- 4. The name of the laboratory used for sample analyses and its certification number, if the laboratory is licensed by the Arizona Department of Health Services;
- 5. The quality assurance/quality control documentation, including the analytical methods used by the laboratory, method number, detection limits, and any blank, duplicate, and spike sample information necessary to properly interpret the data, if different from that stated in the QAP or SAP;
- 6. The data reporting unit of measure;
- 7. Any field notes, laboratory comments, or laboratory notations concerning a deviation from standard procedures, quality control, or quality assurance that affects data reliability, data interpretation, or

data validity; and

8. Any other information, such as complete field notes, photographs, climate, or other information related to flow, field conditions, or documented sources of pollutants in the watershed, if requested by the Department for interpreting or validating data.

- C. Record keeping. The monitoring entity shall maintain all records, including sample results, for the duration of the listing cycle. If a surface water or segment is added to the Planning List or to the 303(d) List, the Department shall coordinate with the monitoring entity to ensure that records are kept for the duration of the listing.

R18-11-603. General Data Interpretation Requirements

- A. The Department shall use the following data conventions to interpret data for impaired water identifications and TMDL decisions:
1. Data reported below laboratory detection limits.
 - a. When the analytical result is reported as <X, where X is the laboratory detection limit for the analyte and the laboratory detection limit is less than or equal to the surface water quality standard, consider the result as meeting the water quality standard:
 - i. Use these statistically derived values in trend analysis, descriptive statistics or modeling if there is sufficient data to support the statistical estimation of values reported as less than the laboratory detection limit; or
 - ii. Use one-half of the value of the laboratory detection limit in trend analysis, descriptive statistics, or modeling, if there is insufficient data to support the statistical estimation of values reported as less than the laboratory detection limit.
 - b. When the sample value is less than or equal to the laboratory detection limit but the laboratory detection limit is greater than the surface water quality standard, shall not use the result for impaired water identifications or TMDL decisions;
 2. Identify the field equipment specifications used for each listing cycle or TMDL developed. A field sample measurement within the manufacturer's specification for accuracy meets surface water quality standards;
 3. Resolve a data conflict by considering the factors identified under the weight-of-evidence determination in R18-11-605(B);
 4. When multiple samples from a surface water or segment are not

spatially or temporally independent or when lake samples are from multiple depths, use the following resultant value to represent the specific dataset:

- a. The appropriate measure of central tendency for the dataset for:
 - i. A pollutant listed in the surface water quality standards 18 A.A.C. 11, Article 1, Appendix A, Table 1, except for nitrate or nitrate/nitrite;
 - ii. A chronic water quality standard for a pollutant listed in 18 A.A.C. 11, Article 1, Appendix A, Table 2;
 - iii. A surface water quality standard for a pollutant that is expressed as an annual or geometric mean;
 - iv. The surface water quality standard for temperature or the single sample maximum water quality standard for suspended sediment concentration, nitrogen, and phosphorus in R18-11-109;
 - v. The surface water quality standard for radiochemicals in R18-11-109(G); or
 - vi. Except for chromium, all single sample maximum water quality standards in R18-11-112.
- b. The maximum value of the dataset for:
 - i. The acute water quality standard for a pollutant listed in 18 A.A.C. 11, Article 1, Appendix A, Table 2 and acute water quality standard in R18-11-112;
 - ii. The surface water quality standard for nitrate or nitrate/nitrite in 18 A.A.C. 11, Article 1, Appendix A, Table 1;
 - iii. The single sample maximum water quality standard for bacteria in subsections R18-11-109(A); or
 - iv. The 90th percentile water quality standard for nitrogen and phosphorus in R18-11-109(F) and R18-11-112.
- c. The worst case measurement of the dataset for:
 - i. Surface water quality standard for dissolved oxygen under R18-11-109(E). For purposes of this subsection, worst case measurement means the minimum value for dissolved oxygen;
 - ii. Surface water quality standard for pH under R18-11-109(B). For purposes of this subsection, "worst case measurement" means both the minimum and maximum value for pH.

B. The Department shall not use the following data for placing a surface water or segment on the Planning List, the 303(d) List, or in making a TMDL decision.

1. Any measurement outside the range of possible physical or chemical measurements for the pollutant or measurement equipment,
2. Uncorrected data transcription errors or laboratory errors, and
3. An outlier identified through statistical procedures, where further evaluation determines that the outlier represents a valid measure of water quality but should be excluded from the dataset.

C. The Department may employ fundamental statistical tests if appropriate for the collected data and type of surface water when evaluating a surface water or segment for impairment or in making a TMDL decision. The statistical tests include descriptive statistics, frequency distribution, analysis of variance, correlation analysis, regression analysis, significance testing, and time series analysis.

D. The Department may employ modeling when evaluating a surface water or segment for impairment or in making a TMDL decision, if the method is appropriate for the type of waterbody and the quantity and quality of available data meet the requirements of R18-11-602. Modeling methods include:

- a. Better Assessment Science Integrating Source and Nonpoint Sources (BASINS),
- b. Fundamental statistics, including regression analysis,
- c. Hydrologic Simulation Program-Fortran (HSPF),
- d. Spreadsheet modeling, and
- e. Hydrologic Engineering Center (HEC) programs developed by the Army Corps of Engineers.

R18-11-604. Types of Surface Waters Placed on the Planning List and 303(d) List

A. The Department shall evaluate, at least every five years, Arizona's surface waters by considering all readily available data.

1. The Department shall place a surface water or segment on:
 - a. The Planning List if it meets any of the criteria described in subsection (D), or
 - b. The 303(d) List if it meets the criteria for listing described in subsection (E).
2. The Department shall remove a surface water or segment from the

Planning List based on the requirements in R18-11-605(E)(1) or from the 303(d) List, based on the requirements in R18-11-605(E)(2).

3. The Department may move surface waters or segments between the Planning List and the 303(d) List based on the criteria established in R18-11-604 and R18-11-605.

B. When placing a surface water or segment on the Planning List or the 303(d) List, the Department shall list the stream reach, derived from EPA's Reach File System or *National Hydrography Dataset*, or the entire lake, unless the data indicate that only a segment of the stream reach or lake is impaired or not attaining its designated use, in which case, the Department shall describe only that segment for listing.

C. Exceptions. The Department shall not place a surface water or segment on either the Planning List or the 303(d) List if the non-attainment of a surface water quality standard is due to one of the following:

1. Pollutant loadings from naturally occurring conditions alone are sufficient to cause a violation of applicable water quality standards;
2. The data were collected within a mixing zone or under a variance or nutrient waiver established in a NPDES or AZPDES permit for the specific parameter and the result does not exceed the alternate discharge limitation established in the permit. The Department may use data collected within these areas for modeling or allocating loads in a TMDL decision; or
3. An activity exempted under R18-11-117, R18-11-118, or a condition exempted under R18-11-119.

D. Planning List.

1. The Department shall:

- a. Use the Planning List to prioritize surface waters for monitoring and evaluation as part of the Department's watershed management approach;
- b. Provide the Planning List to EPA; and
- c. Evaluate each surface water and segment on the Planning List for impairment based on the criteria in R18-11-605(D) to determine the source of the impairment.

2. The Department shall place a surface water or segment on the Planning List based on the criteria in R18-11-605(C). The Department may also include a surface water or segment on the Planning List

when:

- a. A TMDL is completed for the pollutant and approved by EPA;
- b. The surface water or segment is on the 1998 303(d) List but the dataset used for the listing:
 - i. Does not meet the credible data requirements of R18-11-602, or
 - ii. Contains insufficient samples to meet the data requirements under R18-11-605(D);
- c. Some monitoring data exist but there are insufficient data to determine whether the surface water or segment is impaired or not attaining, including:
 - i. A numeric surface water quality standard is exceeded, but there are not enough samples or sampling events to fulfill the requirements of R18-11-605(D);
 - ii. Evidence exists of a narrative standard violation, but the amount of evidence is insufficient, based on narrative implementation procedures and the requirements of R18-11-605(D)(3);
 - iii. Existing monitoring data do not meet credible data requirements in R18-11-602; or
 - iv. A numeric surface water quality standard is exceeded, but there are not enough sample results above the laboratory detection limit to support statistical analysis as established in R18-11-603(A)(1).
- d. The surface water or segment no longer meets the criteria for impairment based on a change in the applicable surface water quality standard or a designated use approved by EPA under section 303(c)(1) of the Clean Water Act, but insufficient current or original monitoring data exist to determine whether the surface water or segment will meet current surface water quality standards;
- e. Trend analysis using credible and scientifically defensible data indicate that surface water quality standards may be exceeded by the next assessment cycle;
- f. The exceedance of surface water quality standards is due to pollution, but not a pollutant;
- g. Existing data were analyzed using methods with laboratory detection limits above the numeric surface water quality standard but analytical methods with lower laboratory detection limits are available;
- h. The surface water or segment is expected to attain its designated

use by the next assessment as a result of existing or proposed technology-based effluent limitations or other pollution control requirements under local, state, or federal authority. The appropriate entity shall provide the Department with the following documentation to support placement on the Planning List:

- i. Verification that discharge controls are required and enforceable;
- ii. Controls are specific to the surface water or segment, and pollutant of concern;
- iii. Controls are in place or scheduled for implementation; and
- iv. There are assurances that the controls are sufficient to bring about attainment of water quality standards by the next 303(d) List submission; or
- i. The surface water or segment is threatened due to a pollutant and, at the time the Department submits a final 303(d) List to EPA, there are no federal regulations implementing section 303(d) of the Clean Water Act that require threatened waters be included on the list.

E. 303(d) List. The Department shall:

- 1. Place a surface water or segment on the 303(d) List if the Department determines:
 - a. Based on R18-11-605(D), that the surface water or segment is impaired due to a pollutant and that a TMDL decision is necessary; or
 - b. That the surface water or segment is threatened due to a pollutant and, at the time the Department submits a final 303(d) List to EPA, there are federal regulations implementing section 303(d) of the Clean Water Act that require threatened waters be included on the list.
- 2. Provide public notice of the 303(d) List according to the requirements of A.R.S. § 49-232 and submit the 303(d) List according to section 303(d) of the Clean Water Act.

R18-11-605. Evaluating A Surface Water or Segment For Listing and Delisting

A. The Department shall compile and evaluate all reasonably current, credible, and scientifically defensible data to determine whether a surface water or segment is impaired or not attaining.

B. Weight-of-evidence approach.

- 1. The Department shall consider the following concepts when

evaluating data:

- a. Data or information collected during critical conditions may be considered separately from the complete dataset, when the data show that the surface water or segment is impaired or not attaining its designated use during those critical conditions, but attaining its uses during other periods. Critical conditions may include stream flow, seasonal periods, weather conditions, or anthropogenic activities;
 - b. Whether the data indicate that the impairment is due to persistent, seasonal, or recurring conditions. If the data do not represent persistent, recurring, or seasonal conditions, the Department may place the surface water or segment on the Planning List;
 - c. Higher quality data over lower quality data when making a listing decision. Data quality is established by the reliability, precision, accuracy, and representativeness of the data, based on factors identified in R18-11-602(A) and (B), including monitoring methods, analytical methods, quality control procedures, and the documented field and laboratory quality control information submitted with the data. The Department shall consider the following factors when determining higher quality data:
 - i. The age of the measurements. Newer measurements are weighted heavier than older measurements, unless the older measurements are more representative of critical flow conditions;
 - ii. Whether the data provide a direct measure of an impact on a designated use. Direct measurements are weighted heavier than measurements of an indicator or surrogate parameter; or
 - iii. The amount or frequency of the measurements. More frequent data collection are weighted heavier than nominal datasets.
2. The Department shall evaluate the following factors to determine if the water quality evidence supports a finding that the surface water or segment is impaired or not attaining:
- a. An exceedance of a numeric surface water quality standard based on the criteria in subsections (C)(1), (C)(2), (D)(1), and (D)(2);
 - b. An exceedance of a narrative surface water quality standard based on the criteria in subsections (C)(3) and (D)(3);
 - c. Additional information that determines whether a water quality standard is exceeded due to a pollutant, suspected pollutant, or naturally occurring condition:
 - i. Soil type, geology, hydrology, flow regime, biological

community, geomorphology, climate, natural process, and anthropogenic influence in the watershed;

- ii. The characteristics of the pollutant, such as its solubility in water, bioaccumulation potential, sediment sorption potential, or degradation characteristics, to assist in determining which data more accurately indicate the pollutant's presence and potential for causing impairment; and
 - iii. Available evidence of direct or toxic impacts on aquatic life, wildlife, or human health, such as fish kills and beach closures, where there is sufficient evidence that these impacts occurred due to water quality conditions in the surface water.
- d. Other available water quality information, such as NPDES or AZPDES water quality discharge data, as applicable.
- e. If the Department determines that a surface water or segment does not merit listing under numeric water quality standards based on criteria in subsections (C)(1), (C)(2), (D)(1), or (D)(2) for a pollutant, but there is evidence of a narrative standard exceedance in that surface water or segment under subsection (D)(3) as a result of the presence of the same pollutant, the Department shall list the surface water or segment as impaired only when the evidence indicates that the numeric water quality standard is insufficient to protect the designated use of the surface water or segment and the Department justifies the listing based on any of the following:
- i. The narrative standard data provide a more direct indication of impairment as supported by professionally prepared and peer-reviewed publications;
 - ii. Sufficient evidence of impairment exists due to synergistic effects of pollutant combinations or site-specific environmental factors; or
 - iii. The pollutant is bioaccumulative, relatively insoluble in water, or has other characteristics that indicate it is occurring in the specific surface water or segment at levels below the laboratory detection limits, but at levels sufficient to result in an impairment.
3. The Department may consider a single line of water quality evidence when the evidence is sufficient to demonstrate that the surface water or segment is impaired or not attaining.

C. Planning List.

1. When evaluating a surface water or segment for placement on the Planning List.

a. Consider at least ten spatially or temporally independent samples collected over three or more temporally independent sampling events; and

b. Determine numeric water quality standards exceedances. The Department shall:

i. Place a surface water or segment on the Planning List following subsection (B), if the number of exceedances of a surface water quality standard is greater than or equal to the number listed in Table 1, which provides the number of exceedances that indicate a minimum of a 10 percent exceedance frequency with a minimum of a 80 percent confidence level using a binomial distribution for a given sample size; or

ii. For sample datasets exceeding those shown in Table 1, calculate the number of exceedances using the following equation: $(X \geq x | n, p)$ where n = number of samples; p = exceedance probability of 0.1; x = smallest number of exceedances required for listing with " n " samples; and confidence level ≥ 80 percent.

2. When there are less than ten samples, the Department shall place a surface water or segment on the Planning List following subsection (B), if three or more temporally independent samples exceed the following surface water quality standards:

a. The surface water quality standard for a pollutant listed in 18 A.A.C. 11, Article 1, Appendix A, Table 1, except for nitrate or nitrite/nitrite;

b. The surface water quality standard for temperature or the single sample maximum water quality standard for suspended sediment concentration, nitrogen, and phosphorus in R18-11-109;

c. The surface water quality standard for radiochemicals in R18-11-109(G);

d. The surface water quality standard for dissolved oxygen under R18-11-109(E);

e. The surface water quality standard for pH under R18-11-109(B); or

f. The following surface water quality standards in R18-11-112:

i. Single sample maximum standards for nitrogen and phosphorus,

ii. All metals except chromium, or

iii. Turbidity.

3. The Department shall place a surface water or segment on the Planning List if information in subsections (B)(2)(c), (B)(2)(d), and (B)(2)(e) indicates that a narrative water quality standard violation exists, but no narrative implementation procedure required under A.R.S. § 49-232(F) exists to support use of the information for listing.

D. 303(d) List.

1. When evaluating a surface water or segment for placement on the 303(d) List.

a. Consider at least 20 spatially or temporally independent samples collected over three or more temporally independent sampling events; and

b. Determine numeric water quality standards exceedances. The Department shall:

i. Place a surface water or segment on the 303(d) List, following subsection (B), if the number of exceedances of a surface water quality standard is greater than or equal to the number listed in Table 2, which provides the number of exceedances that indicate a minimum of a 10 percent exceedance frequency with a minimum of a 90 percent confidence level using a binomial distribution, for a given sample size; or

ii. For sample datasets exceeding those shown in Table 2, calculate the number of exceedances using the following equation: $(X \geq x | n, p)$ where n = number of samples; p = exceedance probability of 0.1; x = smallest number of exceedances required for listing with " n " samples; and confidence level ≥ 90 percent.

2. The Department shall place a surface water or segment on the 303(d) List, following subsection (B) without the required number of samples or numeric water quality standard exceedances under subsection (D)(1), if either the following conditions occur:

a. More than one temporally independent sample in any consecutive three-year period exceeds the surface water quality standard in:

i. The acute water quality standard for a pollutant listed in 18 A.A.C. 11, Article 1, Appendix A, Table 2 and the acute water quality standards in R18-11-112;

ii. The surface water quality standard for nitrate or

nitrate/nitrite in 18 A.A.C. 11, Article 1, Appendix A, Table 1; or

iii. The single sample maximum water quality standard for bacteria in subsections R18-11-109(A).

b. More than one exceedance of an annual mean, 90th percentile, aquatic and wildlife chronic water quality standard, or a bacteria 30-day geometric mean water quality standard occurs, as specified in R18-11-109, R18-11-110, R18-11-112, or 18 A.A.C. 11, Article 1, Appendix A, Table 2.

3. Narrative water quality standards exceedances. The Department shall place a surface water or segment on the Planning List if the listing requirements are met under A.R.S. § 49-232(F).

E. Removing a surface water, segment, or pollutant from the Planning List or the 303(d) List.

1. Planning List. The Department shall remove a surface water, segment, or pollutant from the Planning List when:

a. Monitoring activities indicate that:

- i. There is sufficient credible data to determine that the surface water or segment is impaired under subsection (D), in which case the Department shall place the surface water or segment on the 303(d) List. This includes surface waters with an EPA approved TMDL when the Department determines that the TMDL strategy is insufficient for the surface water or segment to attain water quality standards; or
- ii. There is sufficient credible data to determine that the surface water or segment is attaining all designated uses and standards.

b. All pollutants for the surface water or segment are delisted.

2. 303(d) List. The Department shall:

a. Remove a pollutant from a surface water or segment from the 303(d) List based on one or more of the following criteria:

- i. The Department developed, and EPA approved, a TMDL for the pollutant;
- ii. The data used for previously listing the surface water or segment under R18-11-605(D) is superseded by more recent credible and scientifically defensible data meeting the requirements of R18-11-602, showing that the surface water or segment meets the applicable numeric or narrative surface water quality standard. When evaluating data to remove a

pollutant from the 303(d) List, the monitoring entity shall collect the more recent data under similar hydrologic or climatic conditions as occurred when the samples were taken that indicated impairment, if those conditions still exist;

iii. The surface water or segment no longer meets the criteria for impairment based on a change in the applicable surface water quality standard or a designated use approved by EPA under section 303(c)(1) of the Clean Water Act;

iv. The surface water or segment no longer meets the criteria for impairment for the specific narrative water quality standard based on a change in narrative water quality standard implementation procedures;

v. A re-evaluation of the data indicate that the surface water or segment does not meet the criteria for impairment because of a deficiency in the original analysis; or

vi. Pollutant loadings from naturally occurring conditions alone are sufficient to cause a violation of applicable water quality standards;

b. Remove a surface water, segment, or pollutant from the 303(d) List, based on criteria that are no more stringent than the listing criteria under subsection (D);

c. Remove a surface water or segment from the 303(d) List if all pollutants for the surface water or segment are removed from the list;

d. Remove a surface water, segment, or pollutant, from the 303(d) List and place it on the Planning List, if:

- i. The surface water, segment or pollutant was on the 1998 303(d) List and the dataset used in the original listing does not meet the credible data requirements under R18-11-602, or contains insufficient samples to meet the data requirements under subsection (D); or
- ii. The monitoring data indicate that the impairment is due to pollution, but not a pollutant.

R18-11-606. TMDL Priority Criteria for 303(d) Listed Surface Waters or Segments

A. In addition to the factors specified in A.R.S. § 49-233(C), the Department shall consider the following when prioritizing an impaired water for development of TMDLs:

1. A change in a water quality standard;

2. The date the surface water or segment was added to the 303(d) List;
3. The presence in a surface water or segment of species listed as threatened or endangered under section 4 of the Endangered Species Act;
4. The complexity of the TMDL;
5. State, federal, and tribal policies and priorities; and
6. The efficiencies of coordinating TMDL development with the Department's surface water monitoring program, the watershed monitoring rotation, or with remedial programs.

B. The Department shall prioritize an impaired surface water or segment for TMDL development based on the factors specified in A.R.S. § 49-233(C) and subsection (A) as follows:

1. Consider an impaired surface water or segment a high priority if:
 - a. The listed pollutant poses a substantial threat to the health and safety of humans, aquatic life, or wildlife based on:
 - i. The number and type of designated uses impaired;
 - ii. The type and extent of risk from the impairment to human health, aquatic life, or wildlife;
 - iii. The pollutant causing the impairment, or
 - iv. The severity, magnitude, and duration the surface water quality standard was exceeded;
 - b. A new or modified individual NPDES or AZPDES permit is sought for a new or modified discharge to the impaired water;
 - c. The listed surface water or segment is listed as a unique water in A.A.C. R18-11-112 or is part of an area classified as a "wilderness area," "wild and scenic river," or other federal or state special protection of the water resource;
 - d. The listed surface water or segment contains a species listed as threatened or endangered under the federal Endangered Species Act and the presence of the pollutant in the surface water or segment is likely to jeopardize the listed species;
 - e. A delay in conducting the TMDL could jeopardize the Department's ability to gather sufficient credible data necessary to develop the TMDL;
 - f. There is significant public interest and support for the development of a TMDL;
 - g. The surface water or segment has important recreational and economic significance to the public; or

- h. The pollutant is listed for eight years or more.
2. Consider an impaired surface water or segment a medium priority if:
 - a. The surface water or segment fails to meet more than one designated use;
 - b. The pollutant exceeds more than one surface water quality standard;
 - c. A surface water quality standard exceedance is correlated to seasonal conditions caused by natural events, such as storms, weather patterns, or lake turnover;
 - d. It will take more than two years for proposed actions in the watershed to result in the surface water attaining applicable water quality standards;
 - e. The type of pollutant and other factors relating to the surface water or segment make the TMDL complex; or
 - f. The administrative needs of the Department, including TMDL schedule commitments with EPA, permitting requirements, or basin priorities that require completion of the TMDL.
3. Consider an impaired surface water or segment a low priority if:
 - a. The Department has formally submitted a proposal to delist the surface water, segment, or pollutant to EPA based on R18-11-605(E)(2). If the Department makes the submission outside the listing process cycle, the change in priority ranking will not be effective until EPA approves the submittal;
 - b. The Department has modified, or formally proposed for modification, the designated use or applicable surface water quality standard, resulting in an impaired water no longer being impaired, but the modification has not been approved by EPA;
 - c. The surface water or segment is expected to attain surface water quality standards due to any of the following:
 - i. Recently instituted treatment levels or best management practices in the drainage area,
 - ii. Discharges or activities related to the impairment have ceased, or
 - iii. Actions have been taken and controls are in place or scheduled for implementation that will likely to bring the surface water back into compliance;
 - d. The surface water or segment is ephemeral or intermittent. The Department shall re-prioritize the surface water or segment if the presence of the pollutant in the listed water poses a threat to the health

and safety of humans, aquatic life, or wildlife using the water, or the pollutant is contributing to the impairment of a downstream perennial surface water or segment;

- e. The pollutant poses a low ecological and human health risk;
- f. Insufficient data exist to determine the source of the pollutant load;
- g. The uncertainty of timely coordination with national and international entities concerning international waters;
- h. Naturally occurring conditions are a major contributor to the impairment; and
- i. No documentation or effective analytical tools exist to develop a TMDL for the surface water or segment with reasonable accuracy.

C. The Department will target surface waters with high priority factors in subsections (B)(1)(a) through (B)(1)(d) for initiation of TMDLs within two years following EPA approval of the 303(d) List.

D. The Department may shift priority ranking of a surface water or segment for any of the following reasons:

- 1. A change in federal, state, or tribal policies or priorities that affect resources to complete a TMDL;
- 2. Resource efficiencies for coordinating TMDL development with other monitoring activities, including the Department's ambient monitoring program that monitors watersheds on a 5-year rotational basis;
- 3. Resource efficiencies for coordinating TMDL development with Department remedial or compliance programs;
- 4. New information is obtained that will revise whether the surface water or segment is a high priority based on factors in subsection (B); and
- 5. Reduction or increase in staff or budget involved in the TMDL development.

E. The Department may complete a TMDL initiated before July 12, 2002 for a surface water or segment that was listed as impaired on the 1998 303(d) List but does not qualify for listing under the criteria in R18-11-605, if:

- 1. The TMDL investigation establishes that the water quality standard is not being met and the allocation of loads is expected to bring the surface water into compliance with standards,
- 2. The Department estimates that more than 50 percent of the cost of

completing the TMDL has been spent,

3. There is community involvement and interest in completing the TMDL, or

4. The TMDL is included within an EPA-approved state workplan initiated before July 12, 2002.

Table 1. [Planning List] Minimum Number of Samples Exceeding the Numeric Standard

Number of Samples		Number of Samples Exceeding Standard	Number of Samples		Number of Samples Exceeding Standard	Number of Samples		Number of Samples Exceeding Standard
From	To		From	To		From	To	
10	15	3	182	190	23	368	376	43
16	23	4	191	199	24	377	385	44
24	31	5	200	208	25	386	395	45
32	39	6	209	218	26	396	404	46
40	47	7	219	227	27	405	414	47
48	56	8	228	236	28	415	423	48
57	65	9	237	245	29	424	432	49
66	73	10	246	255	30	433	442	50
74	82	11	256	264	31	443	451	51
83	91	12	265	273	32	452	461	52
92	100	13	274	282	33	462	470	53
101	109	14	283	292	34	471	480	54
110	118	15	293	301	35	481	489	55
119	126	16	302	310	36	490	499	56
127	136	17	311	320	37	500		57
137	145	18	321	329	38	See calculation in R18-11-605.C.1.b.ii if dataset is larger than 500 samples.		
146	154	19	330	338	39			
155	163	20	339	348	40			
164	172	21	349	357	41			
173	181	22	358	367	42			

Table 2. [Impaired Waters] Minimum Number of Samples Exceeding the Numeric Standard

MINIMUM NUMBER OF SAMPLES EXCEEDING THE NUMERIC STANDARD								
Number of Samples		Number of Samples Exceeding Standard	Number of Samples		Number of Samples Exceeding Standard	Number of Samples		Number of Samples Exceeding Standard
From	To		From	To		From	To	
20	25	5	183	191	25	362	370	45
26	32	6	192	199	26	371	379	46
33	40	7	200	208	27	380	388	47
41	47	8	209	217	28	389	397	48
48	55	9	218	226	29	398	406	49
56	63	10	227	235	30	407	415	50
64	71	11	236	244	31	416	424	51
72	79	12	245	253	32	425	434	52
80	88	13	254	262	33	435	443	53
89	96	14	263	270	34	444	452	54
97	104	15	271	279	35	453	461	55
105	113	16	280	288	36	462	470	56
114	121	17	289	297	37	471	479	57
122	130	18	298	306	38	480	489	58
131	138	19	307	315	39	490	498	59
139	147	20	316	324	40	499	500	60
148	156	21	325	333	41	See calculation in R18-11-605.D.1.b.ii if dataset is larger than 500 samples.		
157	164	22	334	343	42			
165	173	23	344	352	43			
174	182	24	353	361	44			

APPENDIX C. Arizona's Surface and Ground Water Quality Standards

SELECTED ARIZONA SURFACE WATER QUALITY NUMERIC STANDARDS (excluding VOCs, SOCs, and pesticides not used in this assessment) Standards revisions adopted in 2002 shown as <i>bold and italics</i> .				
PARAMETER		DESIGNATED USE(S)	STANDARD OR ASSESSMENT CRITERIA	CHRONIC STANDARDS New methods to assess chronic standard violations
Ammonia (NH ₃)		A&Wc/A&Ww	Standard varies by pH., see table in standards.	<i>New standard, varies by temperature and pH</i>
Antimony (Sb)	dissolved	A&Wc/A&Ww A&Wedw	88 µg/L 1,000 µg/L	30 µg/L 600 µg/L
	total	DWS FBC/PBC FC	6 µg/L 560 µg/L 4,300 µg/L	NA
Arsenic (As)	dissolved	A&Wc/A&Ww/A&Wedw A&We	360 µg/L 440 µg/L	190 µg/L 230 µg/L
	total	DWS/FBC AGL PBC FC AGI People's Canyon Creek (Unique Waters)	50 µg/L 200 µg/L 420 µg/L 1450 µg/L 2,000 µg/L 20 µg/L	NA
Barium (Ba)	dissolved	FBC/PBC	98,000 µg/L	NA
	total	DWS	2,000 µg/L	
Beryllium (Be)	dissolved	A&Wc/A&Ww/A&Wedw	65 µg/L	5.3 µg/L
	total	DWS FC PBC/FBC	4 µg/L 1,130 µg/L 2,800 µg/L	NA NA NA
Boron (B)	total	DWS AGI FBC/PBC	630 µg/L 1,000 µg/L 126,000 µg/L	NA
Cadmium (Cd)	dissolved	A&W	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
	total	DWS FC AgI/AgL FBC/PBC	5 µg/L 84 µg/L 50 µg/L 700 µg/L	NA
Chlorine (total residual) (Cl)		A&Wc/A&Ww/A&Wedw DWS FBC/PBC	11 µg/L 700 µg/L 140,000 µg/L	5 µg/L

SELECTED ARIZONA SURFACE WATER QUALITY NUMERIC STANDARDS (excluding VOCs, SOCs, and pesticides not used in this assessment) Standards revisions adopted in 2002 shown as <i>bold and italics</i> .				
PARAMETER		DESIGNATED USE(S)	STANDARD OR ASSESSMENT CRITERIA	CHRONIC STANDARDS New methods to assess chronic standard violations
Chromium (Cr)	dissolved	Unique Waters standards for: West Fork Little Colorado River, above Government Springs Oak Creek and West Fork Oak Creek	10 µg/L 5 µg/L	
	total	DWS/FBC/PBC Agl/Agl	100 µg/L 1,000 µg/L	NA
Chromium III (Cr III)	dissolved	A&Ww/A&Wc/A&We/A&Wedw	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
	total	DWS FC FBC/PBC	10,500 µg/L 1,010,000 µg/L 2,100,000 µg/L	NA
Chromium VI (Cr VI)	dissolved	A&Wc/A&Ww/A&Wedw/ A&We	16 µg/L 34 µg/L	11 µg/L 23 µg/L
	total	DWS FC FBC/PBC	21 2,000 µg/L 4,200 µg/L	NA
Copper (Cu)	dissolved	A&Ww/A&Wc/A&We/A&Wedw	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
		Rio de Flag below WWTP outfall	36 µg/L	
	total	Agl DWS/FBC/PBC Agl	500 µg/L 1,300 µg/L 5,000 µg/L	NA
Cyanide (Cn)	total	A&Wc A&Ww/A&Wedw A&We Agl, DWS FBC/PBC FC	22 µg/L 41 µg/L 84 µg/L 200 µg/L 28,000 µg/L 215,000 µg/L	5.2 µg/L 9.7 µg/L 19 µg/L
Dissolved Oxygen (DO)		A&Ww A&Wc A&Wedw	>6.0 mg/L >7.0 mg/L Applies 3 hours after sunrise to sunset >3.0 mg/L Applies sunset to 3 hours after sunrise >1.0 mg/L note: in compliance if % saturation is = or > 90%	
		West Fork Little Colorado (Unique Waters) Peoples Canyon Creek (Unique Waters) Cienega Creek (Unique Waters) Bonita Creek (Unique Waters)	no decrease due to discharge	
DDE (metabolite of DDT) p,p'-Dichlorodiphenyldichloroethylene		Agl, AgL, FC DWS A&Wc A&Ww, A&Wedw A&We FBC/PBC	0.001 0.1 1.1 µg/L 1.1 µg/L 1.1 µg/L 4.1	-- -- 0.001 0.02 -- --

SELECTED ARIZONA SURFACE WATER QUALITY NUMERIC STANDARDS (excluding VOCs, SOCs, and pesticides not used in this assessment) Standards revisions adopted in 2002 shown as <i>bold and italics</i> .				
PARAMETER		DESIGNATED USE(S)	STANDARD OR ASSESSMENT CRITERIA	CHRONIC STANDARDS New methods to assess chronic standard violations
Escherichia coli		FBC PBC	<i>geometric mean (4 sample minimum) = 126 CFU/100ml</i> <i>single sample maximum = 235 CFU/100ml</i> <i>geometric mean (4 sample minimum) = 126 CFU/100ml</i> <i>single sample maximum = 576 CFU/100ml</i>	
Fluoride (F)		DWS FBC/PBC	4,000 µg/L (4 mg/L) <i>84,000 µg/L (84 mg/L)</i>	NA
Lead (Pb)	dissolved	A&Ww/A&Wc/A&We/A&Wedw	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
	total	DWS/ FBC/PBC AgL Agl	15 µg/L 100 µg/L 10,000 µg/L	NA
Manganese (Mn)		DWS AgI FBC/PBC Unique Waters standards for: People's Canyon Creek, Burro Creek, and Francis Creek	980 µg/L 10,000 µg/L 196,000 µg/L 500 µg/L	NA
Mercury (Hg)	dissolved	A&Wc/A&Ww A&Wedw A&We	2.4 µg/L 2.6 µg/L 5.0 µg/L	0.01 µg/L 0.2 µg/L 2.7 µg/L
	total	FC DWS AgL FBC/PBC	0.6 µg/L 2 µg/L 10 µg/L 420 µg/L	NA
Nickel (Ni)	dissolved	A&W	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
	total	DWS FC FBC/PBC	140 µg/L 4,600 µg/L 28,000 µg/L	
Nitrate (as nitrogen) (NO3)		DWS mean value San Pedro (Curtiss-Benson) FBC/PBC	10,000 µg/L (10 mg/L) 10,000 µg/L (10 mg/L) <i>2,240,000 µg/L (2,240 mg/L)</i>	NA
Nitrate/Nitrite (as nitrogen) (NO3/NO2)		DWS	10,000 µg/L (10 mg/L)	
Nitrite (as nitrogen) (NO2)		DWS FBC/PBC	1,000 µg/L (1 mg/L) <i>140,000 µg/L (140 mg/L)</i>	NA
Nitrogen (N)	total	See nutrient chart below		
pH		A&W/FBC/PBC/AgL DWS AgI All waters except Unique Waters Unique Water standards for: Bonita Creek, Cienega Creek, West Fork Little Colorado, Oak Creek, and West Fork Oak Creek	6.5 - 9.0 5.0 - 9.0 4.5 - 9.0 Maximum change due to discharge = 0.5 No change due to discharge	
Phosphorus (P)	total	See nutrient chart below		

SELECTED ARIZONA SURFACE WATER QUALITY NUMERIC STANDARDS (excluding VOCs, SOCs, and pesticides not used in this assessment)
Standards revisions adopted in 2002 shown as *bold and italics*.

PARAMETER		DESIGNATED USE(S)	STANDARD OR ASSESSMENT CRITERIA	CHRONIC STANDARDS New methods to assess chronic standard violations
Selenium (Se)	total	A&Ww/A&Wc AgL A&We A&Wedw AgL/DWS FBC/PBC FC	20 µg/L 20 µg/L 33 µg/L 50 µg/L 50 µg/L 7,000 µg/L 9,000 µg/L	2 µg/L NA 2 µg/L 2 µg/L NA NA NA
Silver (Ag)	dissolved	A&Ww/A&Wc/A&We/A&Wedw	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
	total	DWS FBC/PBC FC	35 µg/L 7,000 µg/L 107,700 µg/L	NA
Suspended Sediment Concentration		A&Wc, A&Ww	<i>Geometric mean (4 sample minimum) of samples at or near base flow</i> 80 mg/L	
Sulfides (S2)		A&W	100 µg/L (0.1 mg/L) <i>applies only in upper layer in a lake</i>	NA
Temperature (maximum increase due to discharge)		A&Wc A&Ww/A&Wedw Unique Water standards for: Bonita Creek, Cienega Creek, West Fork Little Colorado, and People's Canyon	1.0 ° C 3.0 ° C no increase due to discharge	NA
Thallium (Tl)	dissolved	A&Wc/A&Ww/A&Wedw	700 µg/L	150 µg/L
	total	DWS FC FBC/PBC	2 µg/L 7.2 µg/L 112 µg/L	NA
Total Dissolved Solids (TDS)		Colorado River: below Hoover Dam below Parker Dam at Imperial Dam	NA	(flow-weighted average annual) 723 mg/L 747 mg/L 879 mg/L
		Unique Water standards for: West Fork Little Colorado River, Bonita Creek, & Cienega Creek	no increase due to discharge	NA
Turbidity		Oak Creek (Unique Waters)Peoples Canyon Creek (Unique Waters) Cienega Creek (Unique Waters) Bonita Creek (Unique Waters)	3 NTU change due to discharge 5 NTU change due to discharge 10 NTU 15 NTU	NA
		Former standards: A&Wc (lakes and streams) A&Ww (lakes) A&Ww and A&Wedw (streams)	Former standards 10 NTU 25 NTU 50 NTU	
Uranium (Ur)	dissolved	DWS	35 µg/L	NA
Zinc (Zn)	dissolved	A&Ww/A&Wc/A&We/A&Wedw	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>

SELECTED ARIZONA SURFACE WATER QUALITY NUMERIC STANDARDS (excluding VOCs, SOCs, and pesticides not used in this assessment) Standards revisions adopted in 2002 shown as bold and italics .			
PARAMETER		DESIGNATED USE(S)	STANDARD OR ASSESSMENT CRITERIA
			CHRONIC STANDARDS New methods to assess chronic standard violations
	total	DWS Agl Agl FC FBC/PBC	2,100 µg/L 10,000 µg/L 25,000 µg/L <i>69,000 µg/L</i> 420,000 µg/L
			NA

*Dissolved metal standards are calculated using equations published with the surface water standards (e.g., copper A&Wc acute standard: $e^{(0.9422 [\ln(\text{hardness})] - 1.464)}$. In these equations, hardness (expressed as CaCO₃) does not exceed 400 mg/L; therefore, use 400 mg/L hardness if result is greater than 400 mg/L.

SURFACE WATER QUALITY STANDARDS FOR RADIOCHEMICALS		
Radiochemical	Designated Use	Standard (mean value)
Gross Alpha (excluding radon and uranium)	DWS	15 pCi/L
Radium-226 + Radium-228	DWS	5 pCi/L
Strontium 90	DWS	8 pCi/L
Tritium	DWS	20,000 pCi/L

SURFACE WATER QUALITY NUTRIENT STANDARDS			
WATERSHED OR SITE SPECIFIC LOCATION	Annual Mean	90th Percentile	Single Sample Max
Verde River and tributaries -- above Bartlett Lake	Phosphorus 0.10 mg/L Nitrogen 1.00 mg/L	Phosphorus 0.30 mg/L Nitrogen 1.50 mg/L	Phosphorus 1.00 mg/L Nitrogen 3.00 mg/L
Oak Creek including West Fork (in Verde Watershed) (Unique Waters standard)	Phosphorus 0.10 mg/L Nitrogen 1.00 mg/L	Phosphorus 0.25 mg/L Nitrogen 1.50 mg/L	Phosphorus 0.30 mg/L Nitrogen 2.50 mg/L
Black River, Tonto Creek and their tributaries (in Salt Watershed)	Phosphorus 0.10 mg/L Nitrogen 0.50 mg/L	Phosphorus 0.20 mg/L Nitrogen 1.00 mg/L	Phosphorus 0.80 mg/L Nitrogen 2.00 mg/L
Salt River and tributaries (except Pinal Creek) -- from confluence of Black and White to Roosevelt Lake	Phosphorus 0.12 mg/L Nitrogen 0.60 mg/L	Phosphorus 0.30 mg/L Nitrogen 1.20 mg/L	Phosphorus 1.00 mg/L Nitrogen 2.00 mg/L
Salt River -- below Stewart Mtn. Dam to confluence w/Verde River	Phosphorus 0.05 mg/L Nitrogen 0.60 mg/L	Phosphorus NNS Nitrogen NNS	Phosphorus 0.20 mg/L Nitrogen 3.00 mg/L
Roosevelt, Apache, Canyon, and Saguaro Lakes (composites at 2- and 5-meter depth)	Phosphorus 0.03 mg/L Nitrogen 0.30 mg/L	Phosphorus NNS Nitrogen NNS	Phosphorus 0.60 mg/L Nitrogen 1.00 mg/L (maximum of any set)
Little Colorado River and tributaries -- above River Reservoir. In Greer; So Fork LCR -- above South Fork Campground; and Water Canyon Creek --above USFS boundary	Phosphorus 0.08 mg/L Nitrogen 0.60 mg/L	Phosphorus 0.10 mg/L Nitrogen 0.75 mg/L	Phosphorus 0.75 mg/L Nitrogen 1.10 mg/L
Little Colorado River -- at Apache County Road No 124	Phosphorus NNS Nitrogen NNS	Phosphorus NNS Nitrogen NNS	Phosphorus 0.75 mg/L Nitrogen 1.80 mg/L
Little Colorado River -- from Amity Ditch diversion near AZ Hwy 273 to Lyman Lake (only when < 50 NTU)	Phosphorus 0.20 mg/L Nitrogen 0.70 mg/L	Phosphorus 0.30 mg/L Nitrogen 1.20 mg/L	Phosphorus 0.75 mg/L Nitrogen 1.50 mg/L
Colorado River -- at Mexico/US Northern International Border near Morales Dam	Phosphorus NNS Nitrogen NNS	Phosphorus 0.33 mg/L Nitrogen 2.50 mg/L	Phosphorus NNS Nitrogen NNS
San Pedro River -- from Curtis to Benson.	Phosphorus NNS Nitrogen NNS	Phosphorus NNS Nitrogen NNS	Phosphorus NNS Nitrate (as N) 10 mg/L

Narrative Water Quality Standards

Narrative Surface Water Quality Standards

R18-11-108 -- A surface water shall be free from pollutants in amounts or combinations that:

- Settle to form bottom deposits that inhibit or prohibit the habitation, growth, or propagation of aquatic life or that impair recreational uses (bottom deposits standard);
- Cause objectionable odor in the area in which the surface water is located;
- Cause off-taste or odor in drinking water;
- Cause off-flavor in aquatic organisms or waterfowl;
- Are toxic to humans, animals, plants or other organisms (toxics standard);
- Cause the growth of algae or aquatic plants that inhibit or prohibit the habitation, growth, or propagation of other aquatic life or that impair recreational uses (narrative nutrient standard);
- Cause or contribute to a violation of an aquifer water quality standard prescribed in R18-11-405 or R18-11-406; or
- Change the color of the surface water from natural background levels of color.

A surface water shall be free from oil, grease, and other pollutants that float as debris, foam, or scum; or that cause a film or iridescent appearance on the surface of the water; or that cause a deposit on a shoreline, bank, or aquatic vegetation. The discharge of lubricating oil or gasoline associated with the normal operation of a recreational water-craft shall not be considered a violation of this narrative standard.

Narrative Aquifer Water Quality Standards

R18-11-405:

- A discharge shall not cause a pollutant to be present in an aquifer classified for a drinking water protected use in a concentration which endangers human health.
- A discharge shall not cause or contribute to a violation of a water quality standard established for a navigable water of the state.
- A discharge shall not cause a pollutant to be present in an aquifer which impairs existing or reasonably foreseeable uses of water in an aquifer.

Arizona's Numeric Aquifer Water Quality Standards

ARIZONA'S GROUND WATER STANDARDS FOR INORGANIC CHEMICALS	
CONTAMINANT NAME (ABBREVIATION, TRADE OR GENERIC NAME)	AQUIFER WATER QUALITY STANDARDS (µg/L unless stated)
Antimony (Sb)	6
Arsenic (As)	50
Asbestos	7,000,000 fibers/Liter (longer than 10 µm)
Barium (Ba)	2000
Beryllium (Be)	4
Cadmium (Cd)	5
Chromium (total) (Cr)	100
Cyanide (Cn)	200 (as free cyanide)
Fluoride (F)	4 mg/L
Lead (Pb)	50
Mercury (Hg)	2
Nickel (Ni)	100
Nitrate (NO ₃ as N)	10.0 mg/L
Nitrite (NO ₂ as N)	1.0 mg/L
Nitrate + Nitrite (as N)	10 mg/L
Selenium (Se)	50
Thallium (Tl)	2

ARIZONA'S GROUND WATER STANDARDS FOR ORGANIC CHEMICALS, PESTICIDES, PETROLEUM HYDROCARBONS, AND POLYCHLORINATED BIPHENYL (PCBs)	
CONTAMINANT NAME (ABBREVIATION, TRADE OR GENERIC NAME)	AQUIFER WATER QUALITY STANDARDS (µg/L unless stated)
Alachlor (Lasso)	2
Atrazine (Atrane, Crisazina)	3
Benzene	5
Benzo(a)pyrene	0.2
Carbofuran (Furadan 4F)	40
Carbon tetrachloride (Freon-10)	5
Chlordane	2
2,4-D (Formula 40, Weedar 64) 2,4-Dichlorophenoxyacetic Acid	70
Dalapon or 2,2-Dichloropropionic acid	200
Dibromochloromethane (DBCM or THM)	0.2
Dibromochloropropane (DBCP)	0.2
Dichlorobenzene (DCB)	o-DCB = 600 p-DCB = 75
Dichloroethane (DCA)	1,2-DCA = 5
Dichloroethylene or Dichloroethene (DCE)	1,1-DCE = 7 cis-1,2-DCE = 70 trans-1,2-DCE = 100
Dichloromethane	5
Dichloropropane	1,2-DCP = 5
Di(2-ethylhexyl)adipate (DOA)	400
Di(2-ethylhexyl)phthalate (DOP)	6
Dinoseb 2,4-Dinitro-6-sec-butyl-phenol (DNBP)	7
Dioxin 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.00003
Diquat or Dihydrodipyrro-pyrazidinium salt	20

ARIZONA'S GROUND WATER STANDARDS FOR ORGANIC CHEMICALS, PESTICIDES, PETROLEUM HYDROCARBONS, AND POLYCHLORINATED BIPHENYL (PCBs)	
CONTAMINANT NAME (ABBREVIATION, TRADE OR GENERIC NAME)	AQUIFER WATER QUALITY STANDARDS (µg/L unless stated)
Endothall or Oxalobicyclo-heptane-dicarboxylic acid disodium salt	100
Endrin or Hexachloroepoxyoctahydro-endo-dimethanonaphthalene	2
Ethylene dibromide (EDB)	0.05
Ethylbenzene (ETB)	700
Glyphosate or N-(phosphonomethyl)glycine	700
Heptachlor	0.4
Heptachlor epoxide	0.2
Hexachlorobenzene or Perchlorobenzene	1
Hexachlorocyclopentadiene or Perchlorocyclopentadiene	50
Lindane or gamma-Benzene hexachloride	0.2
Methoxychlor (Methoxy DDT, DMDT)	40
Monochlorobenzene, or Chlorobenzene, or Phenyl chloride	100
Oxamyl	200
Perchloroethylene (PCE), Tetrachloroethylene or Tetrachloroethene	5
Pentachlorophenol	1
Picloram	500
Polychlorinated biphenyl (PCB)	0.5
Silvex 2-(2,4,5-Trichlorophenoxy)propionic acid	50
Simazine 2-Chloro-4,6-bis(ethylamino)-2-triazine	4
Styrene	100
1,2,4-Trichlorobenzene	70
Trichloroethane (TCA)	1,1,1-TCA = 200 1,1,2-TCA = 5

ARIZONA'S GROUND WATER STANDARDS FOR ORGANIC CHEMICALS, PESTICIDES, PETROLEUM HYDROCARBONS, AND POLYCHLORINATED BIPHENYL (PCBs)	
CONTAMINANT NAME (ABBREVIATION, TRADE OR GENERIC NAME)	AQUIFER WATER QUALITY STANDARDS (µg/L unless stated)
Trichloroethylene or Trichloroethene (TCE)	5
Toluene (TOL)	1000
Toxaphene	3
Vinyl chloride (VC)	2
Xylene (XYL)	10,000

ARIZONA'S GROUND WATER STANDARDS FOR RADIOCHEMICALS, PHYSICAL MEASUREMENTS, AND BACTERIA	
CONTAMINANT NAME (ABBREVIATION, TRADE OR GENERIC NAME)	AQUIFER WATER QUALITY STANDARDS (µg/L unless stated)
Beta particle + photon human-caused radionuclides	4 millirem/year
Gross alpha (include Radium-226, exclude radon and uranium)	15 pCi/L
Radium-226 + Radium-228	5 pCi/L
Strontium-90	4 millirem/year 8 pCi/L in bone marrow
Tritium	4 millirem/year 20,000 pCi/L in total body
Total coliform	0 per 100 ml
Turbidity	1 NTU monthly mean, 5 NTU (if 0 fecal coliform after chlorination), 5 NTU (2-day mean)

Surface water and aquifer protection standards are published in Arizona Administrative Code Title 18, Chapter 11 (R18-11-101 through R18-11-506).